

MEET 15 ENTREPRENEURS WHO ARE SHAKING UP YOUR INDUSTRY

FORTUNE

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MARCH 1, 2016

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"I'M GOOD AT BLOCKING
OUT THE NOISE."

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FORTUNE

SPECIAL REPORT

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For a decade and a half, the big chocolate makers have promised to end child labor in their industry—and have spent tens of millions of dollars in the effort. But as of the latest estimate, 2.1 million West African children still do the dangerous and physically taxing work of harvesting cocoa. What will it take to fix the problem?

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ON THE COVER: PHOTOGRAPH BY NANCY NEWBERRY

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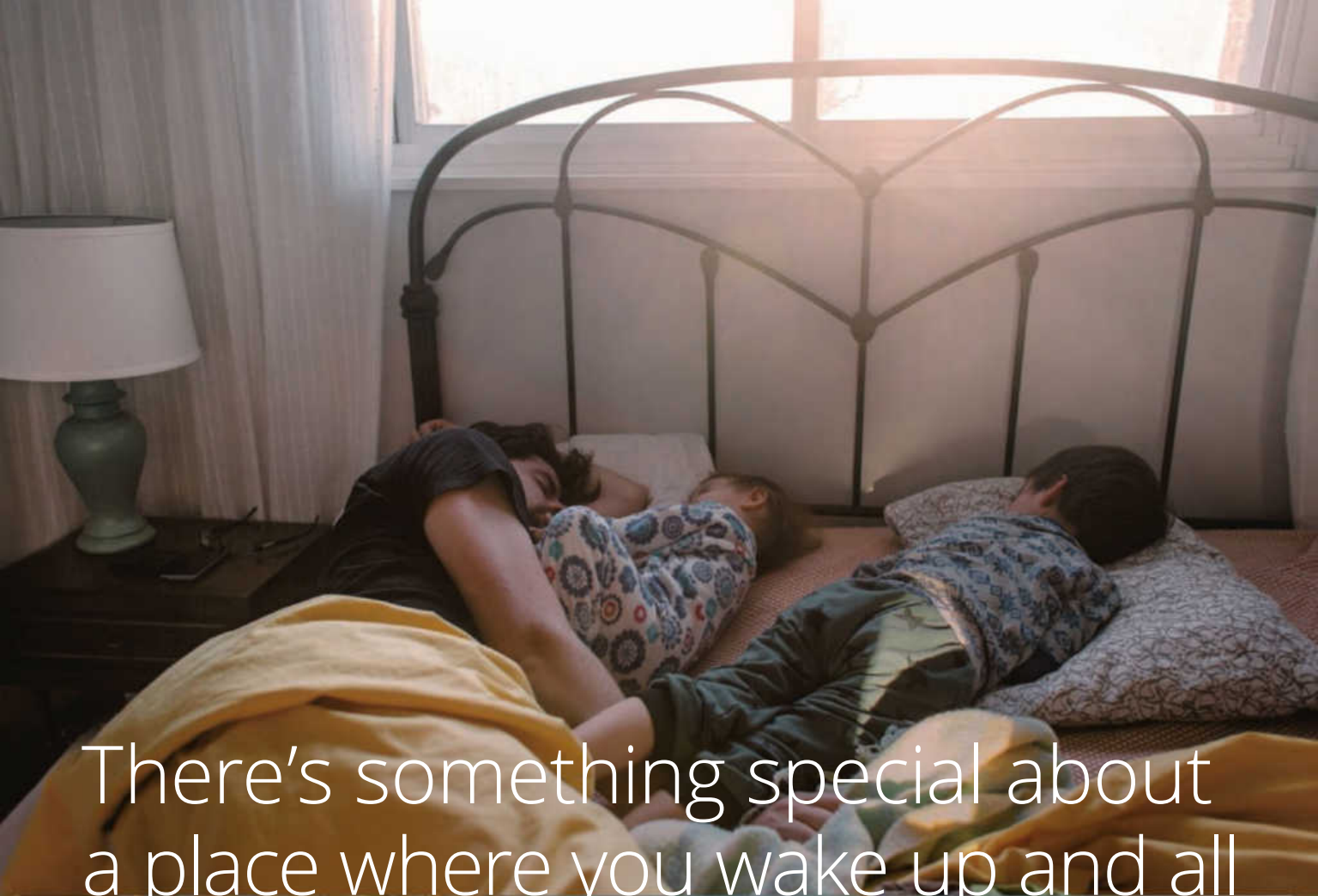
By Ryan Derousseau

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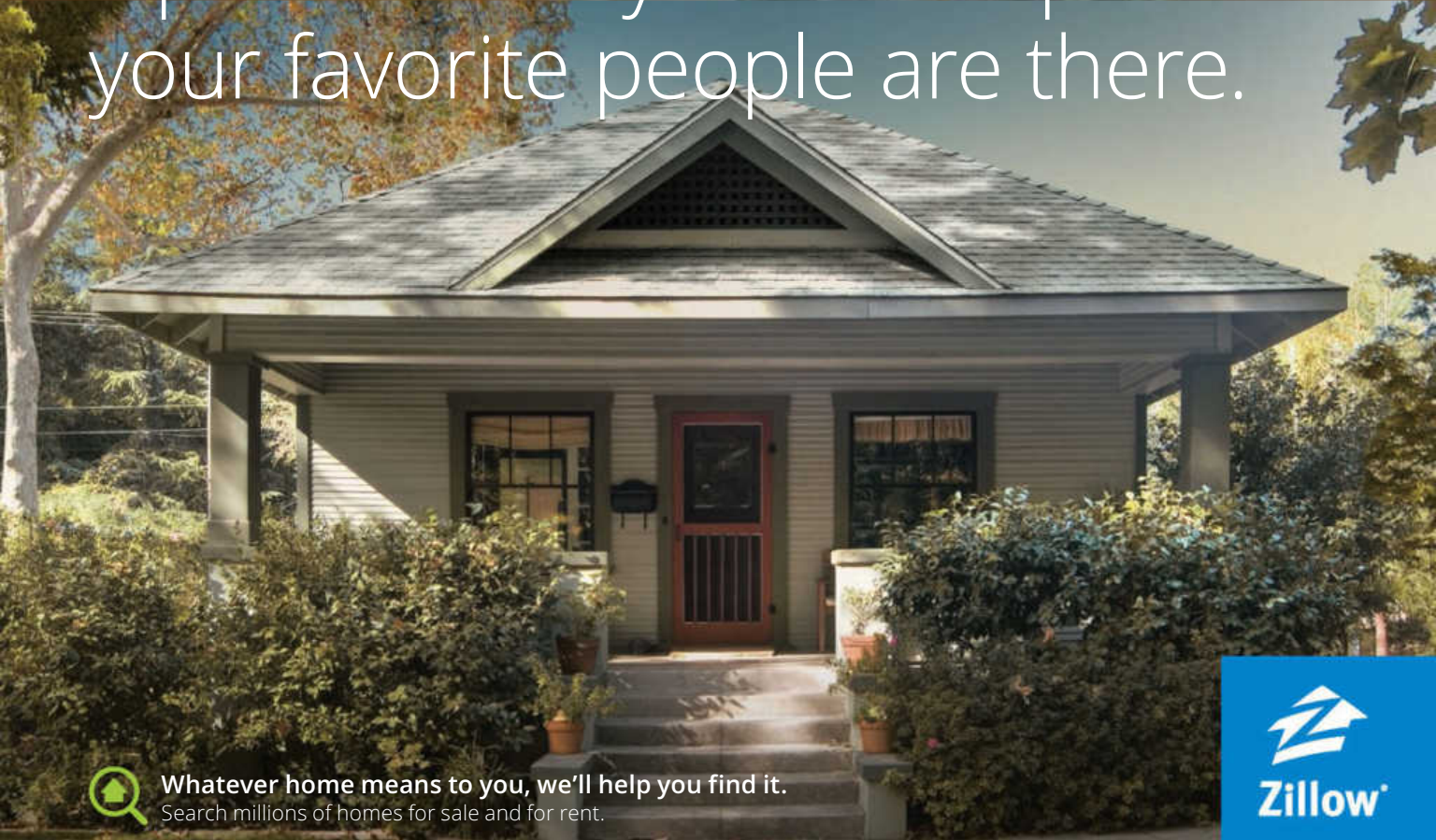
140 BING!

CORRECTION

In "Leading While Black" (Feb. 1), we incorrectly said, in some editions of *Fortune*, that Howard University is in Atlanta. It is in Washington, D.C. We regret the error.



There's something special about
a place where you wake up and all
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Big Ambitions

BIG THINGS IN BUSINESS always start small—a spark, an idea, a moment of inspiration. Yet in today's digital economy, they can scale fast. Two of the three giants at the top of our World's Most Admired Companies list—Apple and Amazon—were created in garages not long ago. The third, Alphabet (formerly known as Google), started as a dissertation project and is still just a teenager. The three now have a combined market value that's roughly equal to the gross domestic product of Mexico. (See our full list of all-stars and industry standouts in the

Our fierce new Venture team, from left: Lauren Covello, Polina Marinova, and Leigh Gallagher

foldout section that begins on page 109.)

That's why at *Fortune* we celebrate size as an aspiration. And it's why we are launching Venture, an all-new section of *Fortune.com* that will serve entrepreneurs, intrapreneurs, and people who nurture the spirit of founders and innovators, wherever they may be. *Fortune's* focus is not "Big Business," but rather the people who want to succeed *big* in business.

Writing about fast-growing startups is nothing new for the magazine. We annually celebrate our "40 Under 40," many of whom are entrepreneurs, and we publish an annual list of Fastest-Growing Companies. But the rapid growth of our digital platforms in the past two years has given us the opportunity to reach a much broader audience than ever before. Venture will use all the rich tools of digital and social media to provide inspiration, insight, and advice to a new generation of business disrupters.

To help us do that, we've hired Lauren Covello, previously managing editor of *Entrepreneur.com*, as editor of Venture. She will be joined by our own social media maven, Polina Marinova, as

deputy editor. They will work closely with assistant managing editor Leigh Gallagher, who oversees 40 Under 40 and who has made interviews with entrepreneurs a staple of *Fortune Live*, the weekly video show she hosts. Over the coming months they'll be building Venture into a multimedia platform for both original journalism and contributions from entrepreneurs, influencers, and other experts.

To honor the launch of Venture, this issue of *Fortune* tells the story of 15 people who are upending a broad spectrum of business. They range from 18-year-old Anya Pogharian, who wants to revolutionize the costly and cumbersome dialysis process, to Wall Street veteran Blythe Masters, who hopes to use block-chain technology to remake banking, to Scooter Braun, who has changed the power equation in the music business. We suggest you pay close attention to these folks; one of them may be about to disrupt your business (see page 98).

As we continue to grow, *Fortune* will stay faithful to its mission—to be an indispensable resource for those who aim to succeed big in business. And we imagine that's a mighty big group indeed.

ALAN MURRAY
Editor

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A STAR ALLIANCE MEMBER



COMPANY SPOTLIGHT | CIGNA

The Fiscal Fitness Plan: When your customers and employees are healthy, so is your bottom line.

REVENUES:

\$37.9
BILLION

8% GROWTH

EARNINGS¹:

\$2.3
BILLION

7% GROWTH

EARNINGS¹
PER SHARE:

\$8.66

10% GROWTH



¹EARNINGS ARE ADJUSTED INCOME
FROM OPERATIONS

Cigna has discovered a formula for success: This \$38 billion Connecticut-based global health service company links a “Go, Know and Take Control” approach to wellness and health improvement to immediate and tangible incentives.

AS PROFESSIONALS ON the frontlines of health, Cigna employees—37,000 strong—connect preventive care to their own well-being, productivity, and the company’s bottom line. Case in point: While only 50% of the U.S. population gets their annual checkup, nine out of 10 Cigna employees report doing so.

As for the tangible incentives, Cigna’s suite of online health resources and personal coaching helps customers set, track, and meet personalized goals. “It’s about the individual. It’s not one-size-fits-all,” says Dr. Isaac Martinez, a Cigna medical director. Once a customer achieves a particular well-being milestone, the company can provide instant gratification through a premium discount or cash-based reward that consumers can see in their paycheck; connecting health to employees’ paychecks proves to work well, Cigna finds.

Cigna distributed \$118 million in rewards to group health plan customers who completed more than 2.5 million health goals last year—goals as simple as completing an online health survey or chatting with a health coach over the phone. Cigna’s coaches work

with consumers to create achievable health goals such as quitting smoking or integrating fitness or nutrition programs to improve body mass index (BMI), and levels of cholesterol, blood pressure and blood sugar, for example.

Recently, Martinez was coaching a Cigna employee to help her lose weight. He talked to her about giving exercise a try—she had been a fad diet fan—and gave her a digital fitness band to track her daily steps. She reported back that she had worked up to half a mile a day, a milestone the employee never thought possible. “She was really proud of herself,” says Martinez, adding that her success is encouragement enough to keep moving toward her larger goal.

Cigna’s success promoting preventive health care has helped its bottom line. Today it is one of the fastest-growing and most profitable health insurers, with 15 million medical customers and more than 90 million customer relationships worldwide.

It’s a mutually beneficial relationship, explains Martinez: “In the health care ecosystem, we do well when you do well. We’re committed to being your advocate, and we work with you as much as possible to keep you healthy. It’s a win-win.” ●

FORTUNE
WORLD'S MOST
ADMIRABLE
COMPANIES 2015

A TRUE WELLNESS PARTNER SENDS YOU TO THE DOCTOR EVEN WHEN YOU'RE HEALTHY.

That's Cigna. A global health service partner that helps you save money by focusing on getting and staying well. Just last year we distributed more than \$118 million* in rewards to customers who went for annual check-ups or took steps to improve their biometrics. The reason is simple: we know that preventive health is the smartest** way to keep your healthcare costs down.

Go. Know. Take Control at Cigna.com/TakeControl.

*Cigna Internal Data of group health customers, 2015 Cigna Operational Report, Full Year 2015

**Cigna Comprehensive Evaluation of Outcomes Based Incentives, February 1, 2015


Not all preventive care services may be covered. See policy documents for benefit information.
Health insurance plans and health benefits and services offered by Cigna Health and Life Insurance Company,
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MARCH 1, 2016

Macro

CLOSER LOOK

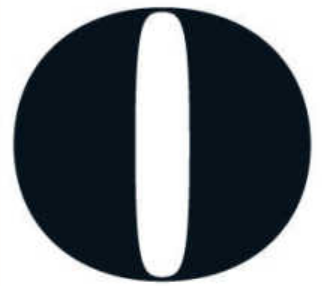
A photograph of Donald Trump at a campaign rally. He is in the foreground, seen from the side, looking towards the right. He is wearing a dark suit. Behind him, a crowd of supporters is visible, some holding signs. One prominent sign in the background reads "TRUMP". The scene is dimly lit, with bright light sources creating a hazy, energetic atmosphere.

**DOES THE ESTABLISHMENT
HAVE A PRAYER?**



Even if the party-elite favorites manage to nab the nomination, the forces that created Trump and Sanders have already reshaped American politics.

By Tory Newmyer



ON THE NIGHT of Feb. 15, the split screen that has defined the 2016 presidential race repeated itself with a new urgency. In one half there was Republican front-runner Donald Trump, rallying thousands at an arena in Greenville, S.C., with immigration jeremiads and classic rock anthems. In the other, on a stage 203 miles away in North Charleston, there was Jeb Bush, the pack leader Trump had long since deposed, making his first public appearance with his brother, former President George W. Bush. Here was Jeb, fighting for his political life in a state that had long favored his family dynasty.

This cycle, dynasty hasn't counted for much. In the debate two days earlier, Trump viciously attacked the elder Bush's record, marking the first time anyone can remember a GOP poll leader lacerating the party's most recent President. Trump earned boos for the performance, but the audience in attendance—South Carolina party faithfuls—was so distant from the Republican rank and file that the question “Why are people booing?” trended on

Supporters of Donald Trump reach out for autographs after a campaign event in South Carolina on Feb. 15.

Google during the debate.

It would be silly, seeing what we've seen, to make any sweeping predictions about how this race will end. In the past, advantages like money raised, endorsements, and name recognition were pretty good indicators of how elections would turn out. If anything, it may be working the other way this time (see chart). Bush, whose campaign was an early juggernaut, embarrassingly floundered despite smashing fundraising records (he still easily retains the money lead, with \$150 million raised, including Super PAC funds, and \$84 million spent). Hillary Clinton, with 184 endorsements from governors and members of Congress, has faced a real challenge from Democratic Socialist Bernie Sanders, who got only two.

The ever-looming specter of a late entry from third-party candidate Michael Bloomberg muddies the picture even more for the powers that be. But even if the party elites do get what they want and the general election features a pair of establishment-friendly candidates (say Clinton and Marco Rubio), they stand to inherit an electorate increasingly riven along class lines as much as partisan ones. Put another way, Trump (and Sanders) may fade this spring, but Trumpism is likely to stick around for a while.

Some recent polling explains why. A solid majority of Americans, 54%, now

think the country's economic and political systems are "stacked against them," and that number has been climbing over the past five years, according to a *Wall Street Journal*/NBC survey. In the same study, nearly seven in 10 Americans describe themselves as angry that government "seems only to be working for those

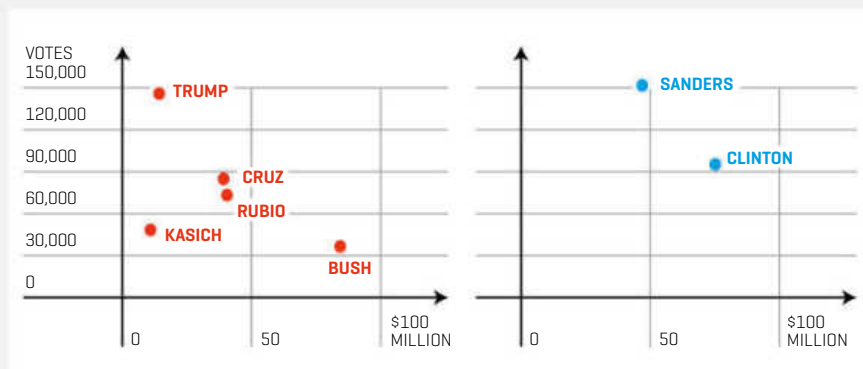
with money and power, like those in Washington or on Wall Street," rather than everyday people. The public is so cynical about elected officials, 55% believe "ordinary Americans" would do a better job solving big problems, a Pew Research Center poll found.

"There's so much anger out there on both sides, successful candidates will need to channel it," says Democratic pollster Jeff Horwitt.

And that suggests the next

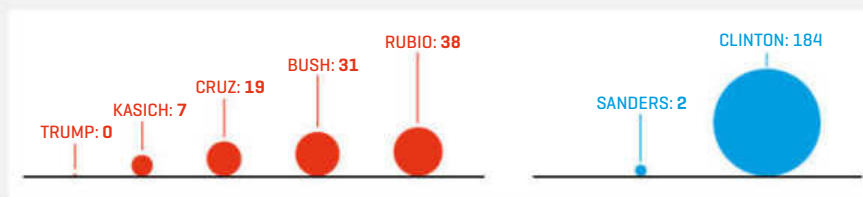
MONEY SPENT RELATIVE TO NUMBER OF VOTES

VOTE TOTALS IN NEW HAMPSHIRE AND IOWA FOR REPUBLICANS; ONLY NEW HAMPSHIRE FOR DEMOCRATS



CANDIDATE ENDORSEMENTS

CONGRESS MEMBERS AND GOVERNORS



SOURCE: CENTER FOR RESPONSIVE POLITICS; SPENDING TOTALS INCLUDE OUTSIDE GROUPS



Former President George W. Bush—along with his wife, Laura, and Sen. Lindsey Graham—campaigns for Jeb Bush at a Feb. 15 rally.

White House occupant will have a tough time, if he or she is even so inclined, advancing corporate priorities like freer trade and comprehensive immigration reform. Trump and Sanders, the two candidates consistently drawing the biggest crowds, are working off a common roster of C-suite bogeymen: price-gouging drug companies, executives moving factories abroad, and billionaire speculators on Wall Street gambling with other people's money. That both candidates stir such deep working-class animus, across party lines, should brace Chamber of Commerce types. For business to get what it wants, it may have to make big, public concessions to the voting masses in return—if not, there are plenty of candidates waiting to do it for them. **IN**



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RECOVERY

WHAT IT WOULD TAKE TO FLINT-PROOF THE NATION

The trouble with trying to solve the country's lead problem is that all the easy fixes have already been done. "Yes, if we could replace all of our 100-year-old water mains overnight, we'd gladly do it," says Gary Burlingame of the Philadelphia water department. But such projects can carry a steep political and economic price tag. Here's what it would cost to put a dent in the lead exposure of American kids:

\$1 trillion

To make all U.S. pipe replacements deemed "urgent" by the American Society of Civil Engineers

\$216 billion

To perform lead-paint abatement on the 24 million at-risk homes, at an average cost of \$9,000 per home

\$3 billion

To treat the estimated 535,000 children with injurious levels of lead in their blood

\$18 million

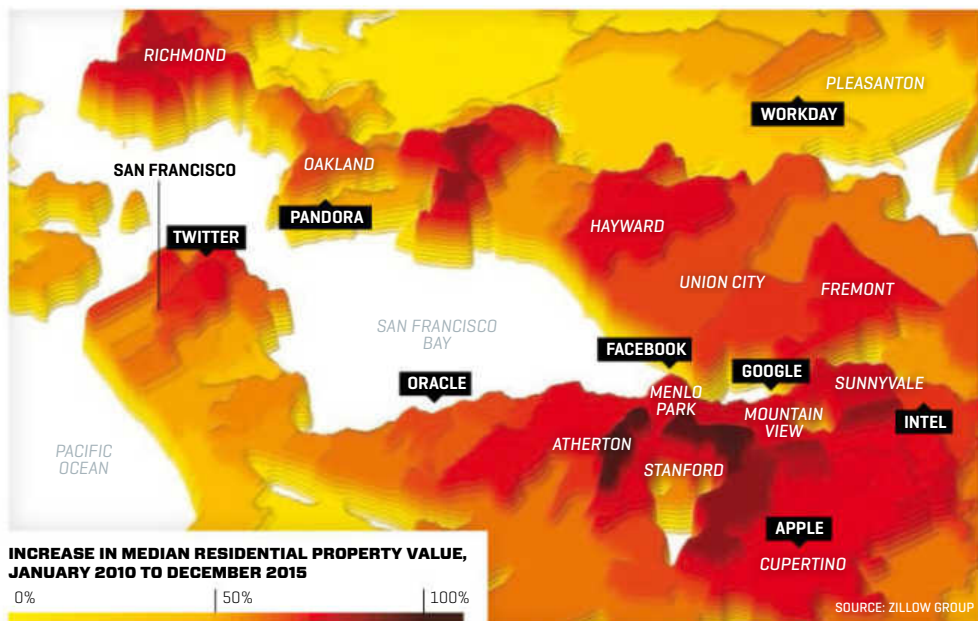
To test the soil in the 13,500 playgrounds in the 100 largest U.S. cities

—Rob Curran



"The challenge I give my product teams isn't, 'What do we do if our competitor comes out with a new shoe upper?' We're worried about what are we going to do if Apple decides they're going to make a shirt, or they're going to make a shoe—and more importantly why don't we beat 'em to it?"

Under Armour CEO Kevin Plank (left) talks to *Fortune*'s Adam Lashinsky about technology in the apparel business.



Valley Fever

THE BAY AREA BUY THAT DOUBLED INVESTORS' MONEY? HOUSING.

SAN FRANCISCO is famously home to not-in-my-backyard restrictive development regulations, helping create lovely streetscapes and a crippling housing shortage. But even the City by the Bay's soaring prices aren't going up as fast as those in nearby towns, where workers of Google, Facebook, and Apple cluster—and which have their own restrictions on development. In several San Francisco neighborhoods, home prices rose more

than 70% since 2010, according to Zillow. But in the Palo Alto zip code between Stanford and the Googleplex, prices climbed 104%—and 101% in tech CEO haven Atherton. The area's housing headache has broad consequences, as high prices and precious land complicate life for both people and companies in the crucial economic corridor. That should worry even those of us paying less than \$4,000 a month in rent. —Anne VanderMey

COURTESY OF FORTUNE VIDEO; FLINT CHART SOURCES: FORTUNE CALCULATIONS; AMERICAN SOCIETY OF CIVIL ENGINEERS; U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT; CENTERS FOR DISEASE CONTROL AND PREVENTION; THE TRUST FOR PUBLIC LAND; GALSON LABOR ATTORNEYS; SCS ACCTEST; TRUE EARTH



**“WHEELS UP LETS ME FLY EFFICIENTLY,
LAND CLOSER, AND MAKE IT HOME IN
TIME FOR A HEALTHY DINNER.”**

Name: Irwin Simon
Title: CEO, Hain Celestial Group, Inc.
Father, Husband, Entrepreneur
Aircraft: King Air 350i

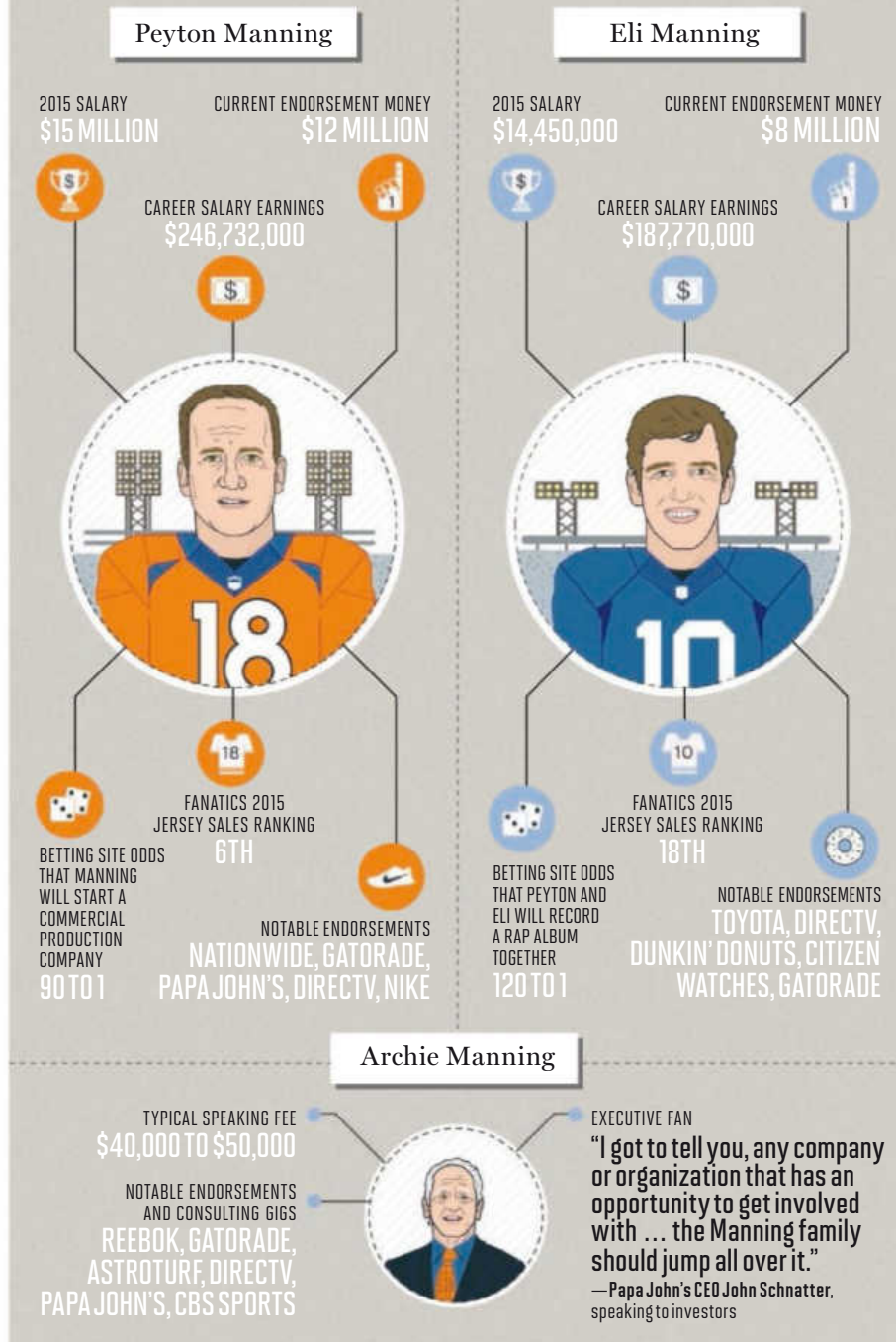
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The Manning Economy

WHEN PEYTON MANNING won Super Bowl 50, he cemented a family legacy as not just a quarterback, but also as a pitchman. Besides collecting a respectable NFL salary, the Broncos quarterback has amassed a small fortune endorsing products like Gatorade and taking a stake in ventures such as Papa John's franchises. His brother

and father are also NFL luminaries and businessmen—with a slew of paychecks and product deals that, if taken together, rival the GDP of a small country. But don't shed a tear for Peyton's vanquished rival. The big game is likely to push the already marketable Cam Newton even higher up the endorsement roster. —Ben Geier

MACRO

MY DOG ATE MY RETURNS

IT'S NOT BILL ACKMAN'S FAULT

In his recent letter to investors, the legendary—if beleaguered—investor Bill Ackman singled out a few culprits for his hedge fund's 20.5% loss in 2015, relative to the S&P 500's 1.4% gain. Here, the highlights:



- RULES**
 The fund got some proprietary info on Valeant, which meant it couldn't trade in the summer "at a time when it would have been prudent to take some money off the table."
- A MISUNDERSTANDING**
 The markets just didn't get it, and docked the book value of the fund's holdings "without a corresponding material diminution in their intrinsic value."
- OTHER HEDGE FUNDS**
 Some hedge funds fled, in a "forced selling of our holdings by investors whose stakes overlap with our own."
- INDEX FUNDS**
 "Their focus on keeping fees low" makes the funds lose sight of "investing in building best-in-class governance oversight operations."
- CHINA**
 The government keeps propping up the currency, meaning "our currency puts, therefore, have not, to date, served to be a useful hedge against declines in our portfolio."

—Jennifer Reingold

**FOR MANY
AN ACTIVE LIFE
STOPS FAR
TOO EARLY** | **OUR
SCIENTISTS
WON'T
ACCEPT THAT**



By 2050 the world's population over 60 will have doubled to two billion, making age-related illness an even greater challenge for society. That's why we're seeking to help people stay healthier and more active in later life, be it through more targeted treatments for cancer

and cardiovascular conditions, solutions for eye diseases, or ways to keep those with arthritis moving. Because life shouldn't stop at 60 – not by any means.

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Science For A Better Life



MAN VS. NATURE

How to Stop Zika

COMPANIES' AND GOVERNMENTS' BEST TACTICS IN THE ALL-OUT SCRAMBLE TO CONTAIN A VIRUS.

DESPITE THE BILLIONS being spent by the governments of dozens of Latin American countries, Zika—a global epidemic linked to birth defects in an estimated 4,000 babies in Brazil alone—is “spreading explosively,” according to the World Health Organization. Brazil’s health minister recently admitted the country was “badly losing” the fight against the virus. Some tactics, though, show more promise than others. —*Laura Lorenzetti*

GLOBAL HEALTH'S BATTLE PLAN



Pregnancy Prevention

Because Zika is most dangerous to unborn babies, governments have asked all women to delay pregnancy—a daunting task given the limited access to birth control in affected regions. The UN estimates that expanding access to contraception would cost \$1.7 billion annually.



Vaccines

Drugmaker Inovio Pharmaceuticals expects to have the first Zika vaccine ready for human testing by the end of 2016. Sanofi also has a program, and GlaxoSmithKline, Merck, Pfizer, and Johnson & Johnson are all evaluating their technologies for such a vaccine.



Eradication

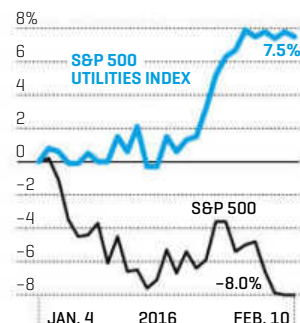
Because pesticides can do only so much, U.K. company Oxitec created a genetically modified mosquito that's unable to produce fertile offspring once released into the wild. The WHO has said the controversial tactic is safe for humans.

MACRO

POWER UP

AND THE BEST-PERFORMING INDUSTRY OF THE YEAR SO FAR IS ... UTILITIES?

Amid the year's market chaos, one sector charged ahead: generally boring, mostly reliable utilities. While the S&P 500 sank 8%, the S&P Utilities index is up 7.5% year to date, and the narrower Dow Jones utilities average climbed 8.4%. Why the surge? It's partly a return to normal after a rough 2015, says Morningstar's Charles Fishman. Plus, the sector has particular appeal in times of uncertainty: Power never goes out of style [and neither do dividends]. —*Jonathan Chew*



SOURCE: S&P CAPITAL IQ

NETFLIX VS. AMAZON

TED SARANDOS
CHIEF CONTENT OFFICER,
NETFLIX



TED HOPE
HEAD OF PRODUCTION,
AMAZON ORIGINAL MOVIES



CLASH OF THE TEDS

AT SUNDANCE in January, Netflix and Amazon each bought a reported six films—more than anyone else. Leading the companies' charge into filmmaking are their studio heads, Ted Sarandos at Netflix and Ted Hope at Amazon. Their strategies differ, but their goals—disruption and domination—are as similar as their names. —*Michal Lev-Ram*

Claim to Fame

Sarandos has led Netflix's transformation into a creator of original programming, starting with the groundbreaking *House of Cards*.

Master Plan

Now that Netflix is winning on the small screen, Sarandos's next step is to turn the streaming site into a big-time movie studio. But he'll have to find a way to make nice with theater chains first. Because Netflix wants to release films online and in cinemas at the same time, many theater companies have refused to work with it.

Big Bet

Spending a reported \$60 million to buy the rights to Brad Pitt's satirical comedy *War Machine*. [The movie is expected to be released this year.]

Before Amazon, Hope produced more than 70 films, including *Happiness* and *21 Grams*. He joined the online retailer's new studio last year.

The Amazon Prime membership program has a reported 41 million subscribers. Netflix has 75 million. Hope is charged with catching up by building out Amazon's movie studio [an Oscar would be nice] and taking a friendlier approach with theater chains—allowing a short window between cinema release and online distribution.

Manchester by the Sea, a Casey Affleck flick that Amazon recently bought for \$10 million, making it the second-biggest deal at Sundance this year.

Heavy MetalSM



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A VIEW FROM THE ALPS

Oracles of Davos

CEOs FORESEE
SWEEPING CHANGES TO
THE WORLD OF WORK.

By Alan Murray

IN NORMAL TIMES, Davos, Switzerland, is a snow-covered ski village whose main street—the Promenade—is lined with quaint shops offering chocolate, watches, and ski boots.

But this January the Promenade was transformed. The stores were emptied, their signage scraped off windows, and they were turned into high-tech “networking hubs,” plastered with ads for

companies like Salesforce, Flex, Infosys, Accenture, and more. Palantir and Facebook built entirely new buildings for the occasion.

The reason? More than ever before, the annual meeting of the World Economic Forum has become a place to do business. The forum’s goal is to “improve the state of the world.” But the CEOs who arrive here en masse do so in large part because it’s an efficient way to meet with colleagues. The pop-up stores along the Promenade

broadcast the opportunity. There is big money at stake.

With so many CEOs crammed into so little space, the Davos gathering offers an unrivaled opportunity to check in on the zeitgeist of the global business elite. Here are our three takeaways:

1. We’re entering a new Industrial Revolution.

Klaus Schwab, founder and orchestrator of the forum, calls it the “fourth” Industrial Revolution—after steam power, electricity, and computers defined the first three, the next will be shaped by sensors and artificial intelligence. Some quibble with the designation, but all agree that mobile computing, the proliferation of inexpensive sensors collecting terabytes of data, and the rise of machine learning that can use that data will fundamentally change the way the global economy is organized.

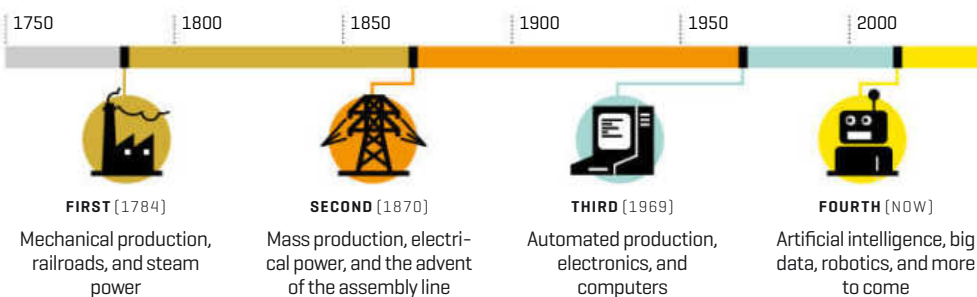
2. The revolution will expand global opportunities but increase inequality within societies.


The Facebook building was filled with displays of the company’s ambitious plans to connect the world’s unconnected. Elsewhere, groups assembled to talk about using new technologies to bank the unbanked, educate the uneducated, and help those without health care. But most also acknowledged that digital technologies have a tendency to create winner-take-most dynamics that widen the gulf between champs and also-rans.

3. The revolution is changing the nature of leadership.

At a private dinner hosted by *Fortune*, a group of 30 execs (together employing 3 million) agreed that the revolution requires business leaders to deliver not just profits but purpose, to engage employees and customers. **■**

THE FOUR INDUSTRIAL REVOLUTIONS





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HUMAN CAPITAL

DEVELOPING AN INTERNAL MARKET FOR TALENT

AS COMPANIES GET BETTER AT PLACING A VALUE ON POTENTIAL HIRES, OTHERS REALIZE THEY NEED TO TAKE THE SAME APPROACH WITH THEIR OWN WORKERS. *By Geoff Colvin*



SO-CALLED ACQUI-HIRES—buying a startup for the purpose of hiring its talented people—have become common among the likes of Apple, Google, Microsoft, and Facebook.

The result is an expensive buy-and-sell market in top tech talent. Excellent engineers can cost \$1 million to \$2 million just to get on board, and then you have to pay them. Google director of corporate development Dave Sobota told a conference on this topic, “Talent deals are a horribly expensive way to get talent—10 to 100 times as much as we’d pay a recruiter. But it’s a necessity.”

The larger phenomenon is that it’s now possible to know the market worth of talent, and not just in Silicon Valley. Employees can monitor their general value through social media and career sites. The stock market sometimes puts a giant number on top employees. When Kasper Rorsted stepped down as CEO of the German packaged-goods company Henkel in January to become CEO of Adidas, Henkel immediately lost \$2 billion of market capitalization, and Adidas gained \$1 billion. Markets can also deem an individual a debit: When Viacom announced that executive chairman

Sumner Redstone was stepping down, it gained \$1.1 billion of value in 30 minutes.

Such dramatic swings suggest that human capital really has become the most important asset—and that many managers are ignorant of just how beneficial (or not) specific employees are. One solution is to create an internal market for talent. These have grown in popularity and are used by such major employers as Intel, Cisco, and W.L. Gore. The notion is that bosses don’t “own” employees. Job openings are posted to all workers, who can apply confidentially.

Other companies take a less formal approach. Alcoa CEO Klaus Kleinfeld says he brings “the whole executive team into a room for two days to discuss succession planning and the talent that should be developed. We call it Talent Marketplace. In reality it’s a fight for great talent.” The team discusses the best employees and candidates for key positions and works out who will go where. “It’s not rare that you say, ‘Well, that person is ready to develop,’ and people are scribbling it down,” says Kleinfeld. “You can bet that when you’re not looking, they’re already sending notes to the person: ‘Hey, we need to talk.’”

The danger is managers will end up bidding against their own colleagues, raising costs. In formal systems that risk may be averted through preset policies; less formally, the issue is hashed out with a higher executive’s help. Bottom line, says Kleinfeld, facing and resolving such conflicts is “great because you want this vibrancy inside your company so talent knows that if you are great, you have an opportunity.” ■

ILLUSTRATION BY
BRIAN STAUFFER



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EXECUTIVE TRAVEL DOING BUSINESS IN SINGAPORE

TRANSPARENT CORPORATE PRACTICES, Singaporeans' fluency in English (one of four official languages), and a pro-business government have helped this 50-year-old city-state become the world's third-richest country. Established sectors include shipping and finance, and there's an emerging biotech scene: Amgen opened a \$140 million plant in 2014. Impressive but more telling is Singapore's first-place rank on the World Bank's Doing Business 2016 report (the U.S. is seventh). *BY SANJAY SURANA AND JANET LIBERT*

• Getting around

Changi Airport handled 55 million passengers last year, yet immigration and baggage-claim waits are rarely longer than 10 minutes. Taxis take about 30 minutes to get to the business district (tipping is not expected); the MRT subway is a shade longer.

• Best business hotels

The number of world-class hotels is mind-boggling. Among them, the huge resort-style **Shangri-la Hotel**; on Raffles Avenue, the **Mandarin Oriental** and **Ritz-Carlton Millenia**; and in the finance district, the **Carlton City Hotel**.

• Where to entertain clients

At **Forlino**, the Italian food

and views of Marina Bay are outstanding. You can't beat the lovingly made tipples and private rooms at the swank cocktail bar **Manhattan**.

• Local gifts

Look for authentic foods like *bakkwa*, a dried-meat Chinese delicacy (think jerky) at **Lim Chee Guan**, and *kaya*, a sweet, curd-like coconut jam that is available at any supermarket. Also visit **Jamal Kazura Aromatics**, which has been creating natural fragrances for more than 70 years.

• Between meetings

In the business district, the revered **Thian Hock Keng temple** was built without the use of nails and is a fas-

cinating anachronism in the midst of office buildings.

Marina Bay is a marvel of marine engineering—it was created by a mammoth land-reclamation project.

• Skip it

The Singapore Flyer is underwhelming. Instead, check out the nearby **Skypark Observation Deck**. It's cheaper and more memorable.

• Extending your stay

There are more than 10 nonstop, two-hour flights per day between Singapore and the Thai island of **Phuket**, with roundtrip fares starting at just \$80. The hotels are a steal—and the beaches are magnificent.



Singapore's multiculturalism:

Indians and Chinese conversing in fluent Malay is quite normal—there's no one size fits all. Ethnic Malays might not want to shake hands with the opposite sex, since some believe men and women shouldn't touch in public. Giving a Chinese person a clock as a gift is unthinkable; the Chinese words for "clock" and "funeral ritual" sound similar.

General pointers: Exchange business cards with both hands and study the cards before placing on the table; never put them in a bag, wallet, or pocket immediately. Singaporeans are more direct than other Asians, but nonverbal communication can signify intent as implicitly as what's spoken, so pay attention to facial expressions and body language. Avoid extended eye contact—it could be perceived as intimidating and rude—and don't speak confrontationally or in a way that could cause a client or partner to lose face. Tone down the volume; Singaporeans are generally more soft-spoken than Americans. For pointing, the thumb is more acceptable than the forefinger.

Though one party has governed since independence,

Singaporean politics is a complicated subject discussed among friends and family. Skip it. Sports, apart from British Premier League soccer, are not fodder for banter, but do talk about food (Singaporeans' food obsession is legendary), the weather, the wonderful airport, and whether your hosts have always lived here (many Singaporeans have studied or lived abroad; others have emigrated from overseas). Given the importance of civility, emails should err toward the formal and avoid references that might lead the recipient to lose standing in front of his or her peers. This will doom a business relationship.

➔ For a longer, interactive version of this story, go to fortune.com/executivetravel.



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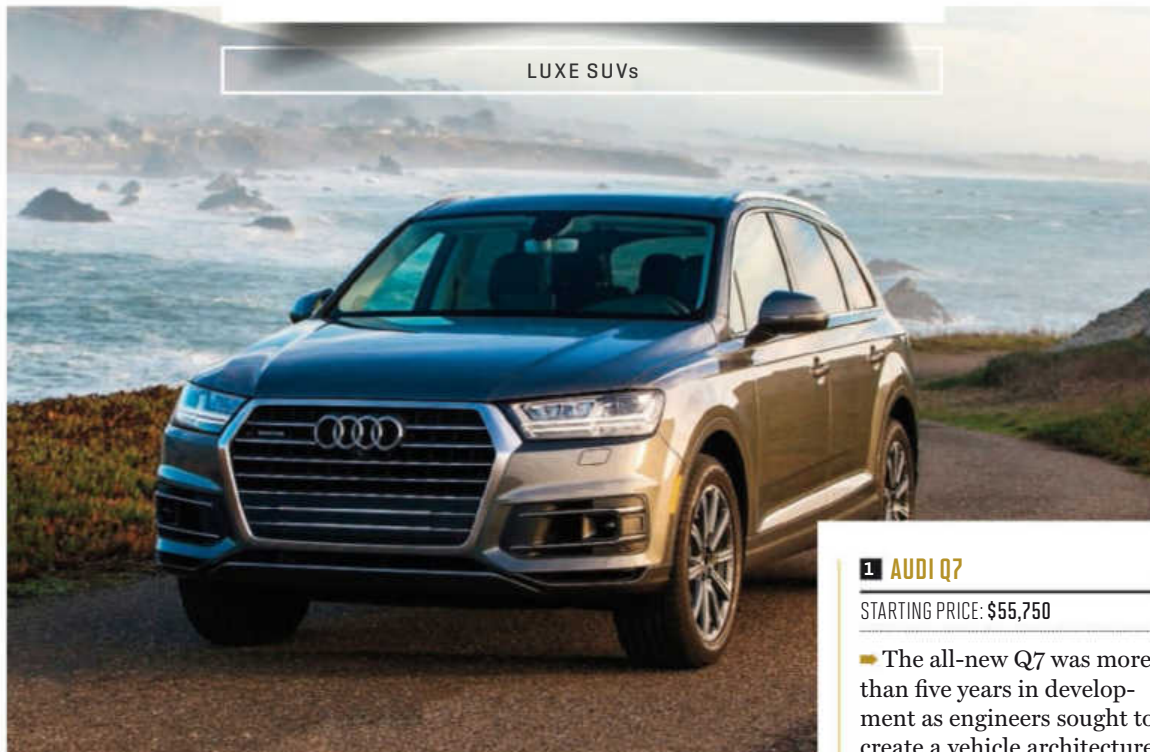


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PASSIONS & Perks

LUXE SUVs



OFF-ROADING IN STYLE

Automakers have raised their game when it comes to SUVs. *By David Kiley*

FOR ABOUT A DECADE, luxury sport-utility vehicles have been living large in the hearts and heated garages of the well-heeled. But the category has been growing so fast that some brands, like Bentley and Jaguar, which heretofore had refused to enter the muddy fray, are launching their first SUVs and will take on established players like Mercedes-Benz, Audi, and Jeep.

Sales of U.S. cars and light trucks grew 5.4% in 2015, a record year. But with the drop in oil prices,

luxury SUV and crossover sales jumped 20%, to 985,480, according to data compiled by Autodata.

The shift to luxury-appointed SUVs is not difficult to figure out. "This is about the needs of utility with the emotional wants of prestige," says Rebecca Lindland, senior director of consumer insights at Kelley Blue Book.

Automakers are raising their game this year and into 2017. Here are five of our favorites.

1 AUDI Q7

STARTING PRICE: \$55,750

■ The all-new Q7 was more than five years in development as engineers sought to create a vehicle architecture that other VW Group siblings Porsche, VW, and Bentley could use to proliferate SUVs. Audi cut 700 pounds from the old version to make it less tank-like, which had bedeviled its ride, while also making it more trail-ready.

The new Q7 comes with a raft of electronic nannies—sensors and technologies—which add up to nearly autonomous driving: brake-based torque vectoring; traffic-jam assist that drives the Q7 on the highway at speeds of up to 40 mph; lane-departure warning and assist; blind-spot monitoring; and adaptive cruise control. Who needs a chauffeur?

2 BENTLEY BENTAYGA

STARTING PRICE: \$229,000

➤ The Bentley Bentayga is not a boosted Bentley Mulsanne. It was conceived to be “the Bentley of SUVs,” says CEO Wolfgang Dürheimer.

And it’s hard not to give the Germans (Bentley is owned by Volkswagen AG) credit for nailing it. The \$229,000 Bentayga is powered by a W-12 engine that produces the power of 600 extremely smooth, muscular horses; it can reach a top speed of 187 mph, with the ability to crawl any washed-out road that gets in its way. Whereas the Jeep Grand Cherokee takes about 15 hours to build, the Bentayga, built in Crewe, England, takes 130 hours—to install electric actuators to balance the ride, an optional Breitling clock, “mineral glass” ...you get the idea.

3 JAGUAR F-PACE

STARTING PRICE: \$40,990

➤ The Jaguar F-Pace, Jag’s first SUV, hits showrooms by late summer. And it’s very pretty. Jaguar designer Ian Callum, a devotee of the Jaguar E-Type, arguably the most beautiful car of the past 50 years, says, “The guiding principle for us was to create a Jaguar you need, not just a Jaguar you want.” In the U.S. the F-Pace has a half-year waiting list. Powering this beauty is a pair of supercharged 3.0-liter V-6s, one at 340 horsepower and the other at 380 hp, or a 2.0-liter

turbo-diesel four-cylinder rated at 180 hp.

4 JEEP GRAND CHEROKEE OVERLAND

STARTING PRICE: \$48,000

➤ The Jeep Grand Cherokee Overland with the Off-Road Adventure II package is what to buy if you want to take it off-roading in the mountains: It comes with

higher wheel clearances, hill climb and descent controls, air suspension, the works. If the Grand feels European, as if it could traverse the Bavarian Alps, it’s because this Jeep was developed under Daimler’s ownership of Chrysler along with the Mercedes M-Class.

It’s powered by a 3.6-liter, 290-hp V-6 engine or the beefier, and far thirstier, 5.7

Hemi V-8. The Overland has a panoramic sunroof and an overall nicer road feel, perfect for traversing pothole-riddled mall parking lots.

5 MERCEDES G-CLASS

STARTING PRICE: \$119,000

➤ This luxury bread box of an SUV was originally developed thanks to a suggestion from the Shah of Iran. No, seriously. Back when he was in charge, he was a significant Daimler shareholder too. The car came out in 1979. The Shah didn’t really have a chance to enjoy it—what with getting overthrown and all.

The G-Class SUV, powered by a 4.0-liter twin-turbo V-8 or a massive 12-cylinder that kicks out 621 hp, is attractive to some buyers precisely because it is burly and a bit of a kidney buster. Honestly, the G-Class can’t even get cup holders right. But it turned up in *The Bourne Supremacy*. Jason’s would-be assassin was chasing him down in one, but Bourne vanquished him in a stolen Volga—hardly an endorsement for an SUV that will set you back six figures. **B**

David Kiley is an automotive journalist and author based in Ann Arbor.



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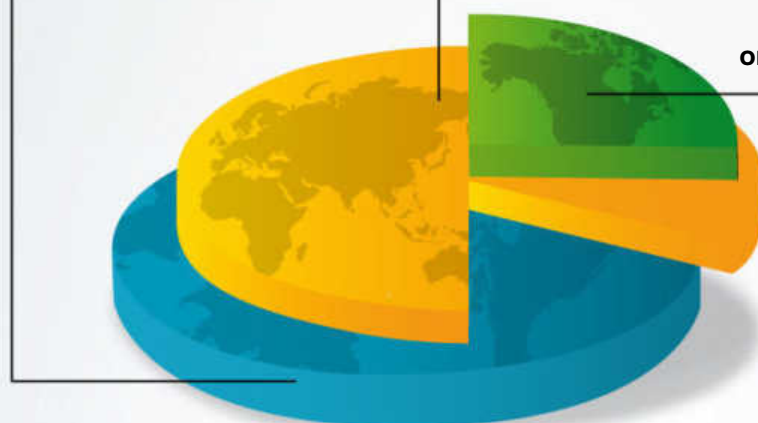
of the time, over the past 30 years, the top-performing equity market has been outside the U.S.¹

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¹Source: MSCI All Country benchmark returns 1983–2013.

²Source: Gross domestic product based on purchasing-power-parity (PPP) share of world total. IMF, Haver Analytics.

³Source: FactSet as of 11/30/2013. Data presented for the MSCI AC World Index, which represents 44 countries and contains 2,436 stocks. The index is not intended to represent the entire global universe of tradable securities.

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won't just
improve
patient care,
it will
heal our
health care
system.”

WILLIAM A. SANGER
CHAIRMAN,
PRESIDENT, AND CEO

Envision maintains an enviable position in integrated health care. The Colorado-based company has nearly doubled its revenues in the last five years to push the number over the \$5 billion mark annually. “The ingredient to our success is simple,” says William A. Sanger, chairman, president, and CEO.

OU**T'S INNOVATING HEALTH** care delivery models that put the patient at the center of our universe,” continues Sanger. “By doing so, we improve patient satisfaction, outcomes, and the cost of care—while also heightening provider fulfillment.”

The key to Envision's momentum lays in its three divisions that, together, provide a continuous suite of patient services: pre-hospital care and transport, in-patient hospital services, and post-acute care. “Our ability to identify and manage the care transitions between pre-acute and post-acute conditions allows us to follow a patient's care and delivery across the health care continuum,” says Sanger.

This management of care transitions across divisions enables Envision to deliver more-effective value-based care in its 21 million annual patient encounters nationwide, focusing less on individual episodes of treatment. “We're moving from a supply-driven system organized around what physicians do toward a patient-centered system organized around what patients need,” says Sanger. “As a result, we're delivering better outcomes for lower costs and empowering patients.”

These divisions are American Medical

Response Inc. (AMR), the nation's largest medical transportation provider; EmCare Inc., the nation's leading provider of integrated facility-based physician services; and Evolution Health, which provides services in the home and alternate settings.

“By employing the best clinicians and technology, we're able to communicate, monitor, access, and deliver great care at the right cost,” says Sanger. “Envision's more than 50,000 providers and support professionals are constantly innovating to improve patient health.” Practitioners utilize, for example, telemedicine, virtual care, and robotic caregivers to broaden the reach of physicians and to pair qualified specialists with patients everywhere. This lends the company an unprecedented comprehensive scale and scope within communities.

Envision is now integrating elements of its segments' operations in key markets. “We're on this journey with our health care partners—including patients themselves—and we will only truly revolutionize health care if we all join forces to redesign the system,” says Sanger. “Focusing on the most effective care delivery will not only drive out costs, it will enhance patient and provider satisfaction. Success won't just improve patient care, it will heal our health care system.” ●

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Venture

HOW I GOT STARTED

OUT OF THE FRYING PAN AND INTO A 350° OVEN

Apparel executive **CHERYL KRUEGER** dreamed of founding her own company. She achieved it with bakery Cheryl & Co.—but it wasn't easy. *Interview by Dinah Eng*



CHERYL KRUEGER rose from poverty to run a \$100 million business at

women's clothier the Limited. But she craved autonomy, and she accomplished it selling cookies. Krueger, now 64, founded baked-goods purveyor Cheryl & Co. Still, independence could be grueling. A contentious divorce, the death of a business partner, and 9/11 weighed heavily. But Krueger nurtured her creation and ultimately sold it to 1-800-FLOWERS for \$40 million in 2005. *Her story:*

My grandma was a phenomenal baker, and I was at her apron strings from age 3 on, learning how to make

cookies. I grew up a farm kid in Bellevue, Ohio. We had an outhouse and were really poor. My parents told me I should just be a farmer's wife, but a teacher inspired me, and I ended up attending Bowling Green State University.

I worked three jobs to afford it, and one was at a clothing store called Caryl Crane. I was going to be a home-economics teacher, but Miss Crane said I'd be a great merchant and buyer. So I changed my major, and after graduating I worked for the Limited in the late '70s. I wanted more control over my schedule and started looking around. I watched what Mrs. Fields and David's Cookies were doing and thought, I can do that. I looked into buying a David's Cookies franchise in Columbus, but they wanted a quarter-million dollars. I decided to open my own store instead.

With more working women, who were time-

poor, I thought there'd be a big market. But no bank would touch me. I was a single female and didn't have any history in this, even though I ran a \$100 million business at the Limited. So I sold all the Limited stock I owned for \$38,000. I asked my college roommate Caryl Walker to become a partner. She took 5% of the business, while I owned 95%.

We opened Cheryl's Cookies in 1981, and from then until 1985, I worked for the Limited and Chaus Sportswear to finance the store, flying from New York to Columbus every weekend to give Caryl two days off. That first year, we did more than \$400,000 in sales and made 5% pretax. In 1982 we opened a second store, then a third the next year.

Not long after, I met a man and didn't see that he had different objectives from mine. We got married, and it lasted less than a year. He sued for permanent

“

NO BANK WOULD TOUCH ME. I WAS A SINGLE FEMALE ... EVEN THOUGH I RAN A \$100 MILLION BUSINESS.”

alimony and got a temporary restraining order on the company funds and my personal funds; we eventually reached a settlement.

In 1985, Caryl was diagnosed with lymphoma and bone marrow cancer. There was no cancer hospital in Columbus then, and no cure. She moved in with me, and I became her full-time caregiver. Others rotated in to help. That was the hardest thing I've ever done. You realize how valuable life is in a whole different way.

On Dec. 31, 1985, I left the Limited to throw my all into the stores. Caryl died a few months later, and I married John Green, a friend she had introduced me to. By then we were going head-to-head with Mrs. Fields. Every time we bid for a location, they'd up the bid and we'd lose the space. We couldn't grow if we couldn't expand.

The bank saw our profits and said if I could bring equity in, it'd loan me a quarter-million dollars. So in 1986, I sold a third of the company to Norman Traeger, an acquaintance, and he gave a guarantee for the loan. (I later bought back his share.)

To grow the company, I went to professor Roger Blackwell, head of Ohio State University's marketing department, for advice. Roger liked our macadamia coconut cookies, so I took him two bags and said, "I need your help." He designed

a case study, which found that customers wanted gift baskets and baked goods.

So in 1986 we changed our name to Cheryl & Co. to shift the brand and began selling brownies, muffins, and gift containers. That was a big turning point, which led to opening our catalogue and corporate-sales divisions. Soon we started getting company orders for 800 gifts. Our sales quickly rose to \$900,000 a year.

In the '90s we really exploded. We wanted to get into the airlines, which wouldn't give us the time of day. Then, in 1992, we went to a trade show for airlines. We got barf bags, filled them with samples, and put on them, "If you're going to toss your cookies, toss the very best." The buyers loved it, and we got \$5 million worth of business from American, Delta, and US Airways.

Then 9/11 happened. We lost \$6.5 million in airline orders, and it never came back. We had to scramble to reinvent ourselves again, so we moved aggressively on the Internet business, which we had started in 1997, and cut costs enough to break even.

In 2002, Hallmark Cards was looking to do shelf-stable cookies, and took a stake. Two years later, they decided to concentrate on cards, and we bought it back. Then 1-800-FLOWERS came calling. In 2005 we sold to them for \$40 million. I stayed on as CEO for four years.

I started a consulting business, but in 2012 my son got me involved with a startup called Life Support, which produces a beverage from a Japanese raisin tree that detoxes your liver if you've got a hangover. Now I own 34% of the company, and I'm having fun as president. Running a business forces me to innovate, keep my mind sharp, and remain young at heart. **19**

MY ADVICE

CHERYL KRUEGER, founder of Cheryl & Co.

DO IT YOURSELF TO KEEP COSTS TIGHT.

We didn't outsource our food production, gift production, or call center. If you can master different areas, there's money to be saved.

DON'T LET EMAILS RULE YOUR TIME.

I have 1,408 emails to answer now—prioritizing is important. The younger generation is constantly looking at their phones, so they don't have time to think strategically.

ACT "AS IF."

I treated the company like it was publicly traded—with a board—years before I sold it, to make the transition cleaner in the event of a sale. The board instilled a level of financial discipline as we grew.



Let's
Go
Places

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SHOULD A NEW LEADER CLEAN HOUSE?

At least one manager is challenging the old approach, but evidence suggests there's wisdom in the traditional way.

By Geoff Colvin



ON THE MONDAY before the Super Bowl, Carolina Panthers general manager Dave Gettleman explained his highly unorthodox decision not to fire anyone when he

was brought in from the New York Giants in 2013. In pro sports, firing people is practically in a new GM's job description. But Gettleman reasoned differently. "You bring the next guy in," he told


reporters, "and how long is it going to take you to train the next guy to get him caught up to the guy you just fired? It doesn't happen overnight. Now that time you took to get the next guy ready, you lost three, four, five, six months." So he worked with what he had, and the once-bedraggled Panthers made it to the Super Bowl, where they lost in an upset. Might Carolina have won if Gettleman had followed tradition? It's impossible to say, of course, but research and experience suggest there are good reasons that new leaders generally clean house.

The decision of whether to replace the top team with one's own choices or stick with the experience of those in place is one that leaders are having to make more often as tenures in high-level jobs continue to shorten. The basic principle they should follow is that "you need your own team," says University of Michigan business professor Noel Tichy, who ran General Electric's Crotonville, N.Y., training center under Jack Welch and as a coach and consultant has seen plenty of CEO transitions up close. He cites the cautionary example of Jacques Nasser, who became Ford's CEO in 1999. Nasser intended to overhaul Ford's sclerotic culture but insisted on doing it with the team he inherited. The old guard rarely embraces culture change. Plenty went wrong, but internal politics undoubtedly poisoned Nasser's efforts, perhaps fatally. He lasted just 34 months.

Research by business professors Ayse Karaevli and Edward Zajac found that "outsider CEOs bring

more performance benefits than insiders when they replace the company's senior management team with new executives in the early post-succession years." The researchers didn't look at new inside leaders who replaced the top team. Is the same guidance valid for them? Recent examples suggest that leaders think so. In October, Jack Dorsey became permanent CEO of Twitter, a company that badly needs help, and four top executives have since left; it's too soon to judge the results. In mid-2014, Brian Cornell took the helm of Target, another troubled company, and at least five top executives have since departed; the CFO has also moved to another job internally, and two former Safeway executives have been installed in high positions. Target's stock has substantially outperformed the S&P since Cornell arrived. Under Walmart chief Doug McMillon, who got the job two years ago, at least four top executives have exited, most notably the head of U.S. stores. Walmart's shares have underperformed the S&P, though turning a ship that big takes time.

Leadership decisions can rarely be reduced to simple rules. But even great leaders say replacing someone is their hardest job, and many regret putting it off too long. On the unavoidable question of whether to replace the top team, the advice is use your judgment—and remember that the hardest thing to do may well be the best thing. **IS**



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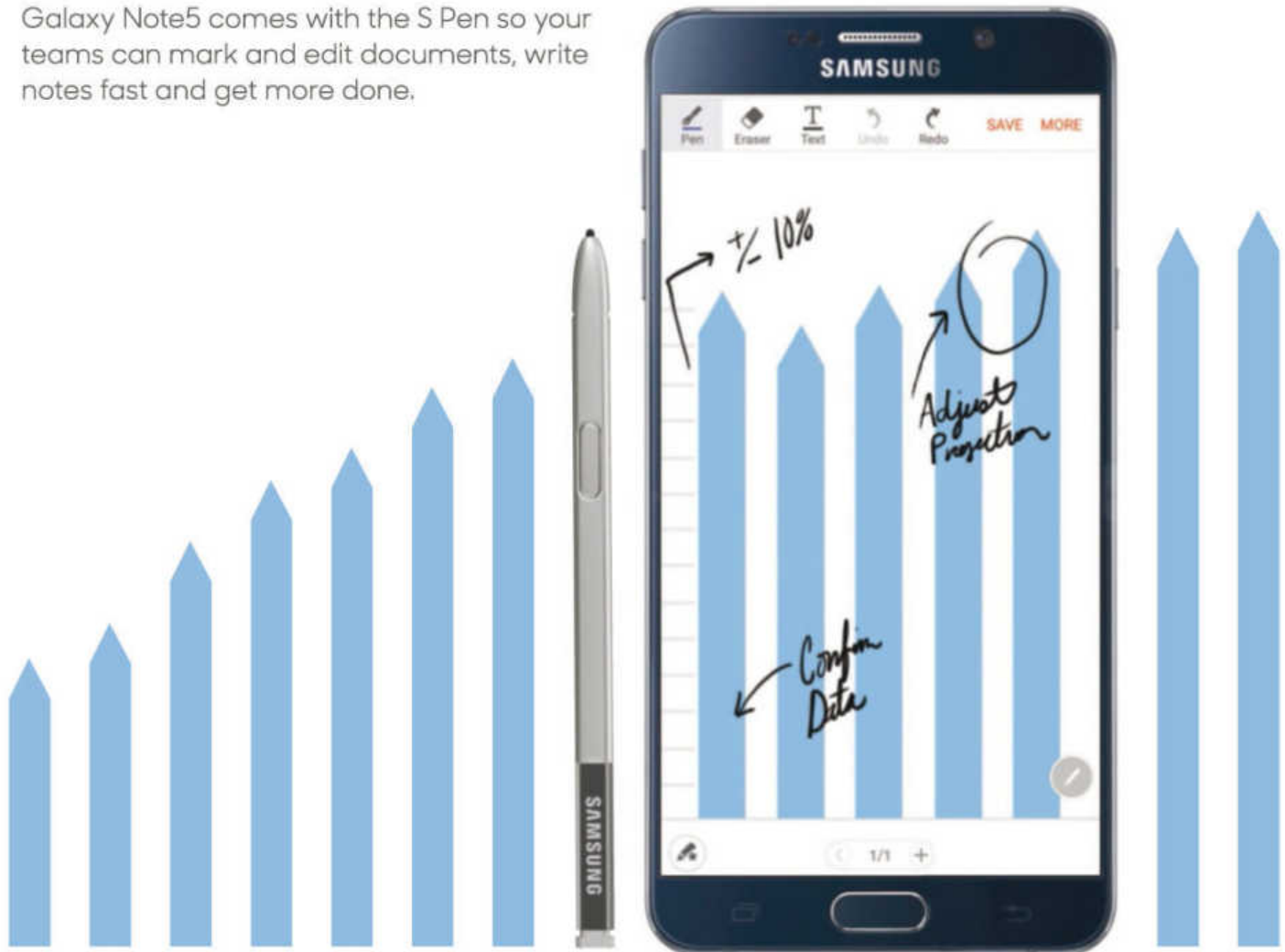
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Tech

LOCATION OF INTEREST

DURHAM, N.C.

The old tobacco town of Durham is ablaze with tech know-how, home to companies large (IBM, EMC) and small. Many are part of American Underground, a community by [the former campus of the American Tobacco Co.](#) Here are five to watch. *By Richard Morgan*

THE GUIDE

[American Underground](#)
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1

CLOUDFACTORY

Cloud-based software and 3,000 workers in Kenya and Nepal power this service, aimed at on-demand tasks, such as video captioning for ESPN and image tagging for Microsoft.

2

CROWDTUNES

The app, which allows a venue's patrons to bid on the music they want to hear, has partnered with bars, universities, and even Applebee's. Instead of \$1 jukebox plays, bids go as high as \$24—and users can "nuke" unwanted songs by paying five times a song's current value.

3

SHOEBOXED

This service combines a human team and automated optical-character-recognition technology to digitize business cards and receipts for more than 1 million people. Its QuickBooks- and Evernote-ready output is intended to streamline expense reports, tax returns, and other back-office mundanities.

4

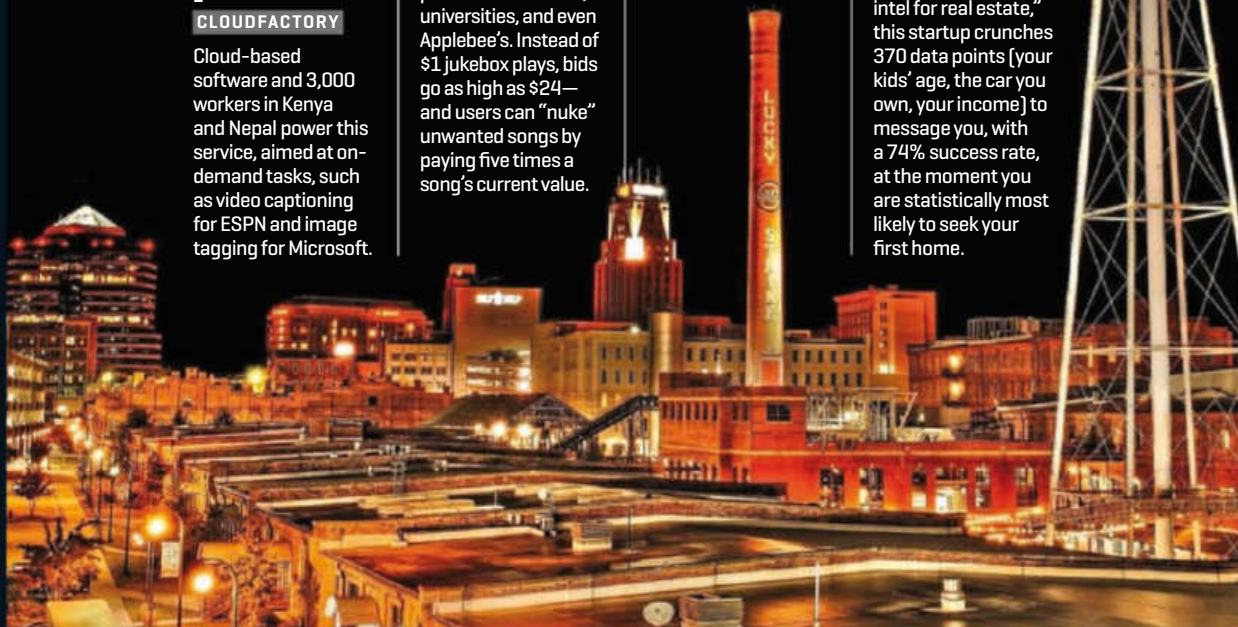
SOLOPRO

Founded last year, this no-commission real estate service raised \$1.6 million from investors (such as home-improvement giant Lowe's) to unbundle the home-buying process into à la carte options. A 3% rebate on the purchase (for buyers) and flat fees for typically unpaid tasks (for agents) keep everyone happy.

5

FIRST

Billed as "predictive intel for real estate," this startup crunches 370 data points (your kids' age, the car you own, your income) to message you, with a 74% success rate, at the moment you are statistically most likely to seek your first home.



COURTESY OF AMERICAN UNDERGROUND

TICKER TAPE

A collection of curiosities

66% SHARE OF "TECH SAVVY" SHOPPERS SATISFIED WITH THE SMARTPHONE SHOPPING EXPERIENCE
SOURCE: UPS/COMSCORE

11% ONLINE SHOPPERS USING ONLY MOBILE



In the Cloud, Google Jockeys for Position

AMAZON DOMINATES THE MARKET FOR CLOUD COMPUTING. MICROSOFT IS MAKING A RUN AMONG BUSINESS CUSTOMERS. SO WHAT'S UP WITH GOOGLE? *By Barb Darrow*

HOW BIG IS THE CLOUD BUSINESS? Big. Really big. The global market for public cloud services will grow 17% to \$204 billion this year, estimates market researcher Gartner, more money than General Motors makes in a year. The growth is a sign that businesses increasingly opt to keep their websites, applications, and

services on another company's computers in a bid to speed operations and save money. It's also evidence of just how big the opportunity is for companies in the technology industry.

Amazon, the market leader, knows this well. Its Amazon Web Services dominates, with a 29% share of the cloud services market, according to Synergy Research. Microsoft does too. Its up-and-coming Azure platform claims another 12%. IBM rounds out the top three with 7%.

And then there is Google. The company's own set of cloud services, dubbed Google Cloud Platform, has attracted attention for features such as automated discounts based on utiliza-

tion. Google has 6% market share. But compared with its peers, it lacks a key attribute: big business customers.

Google is a formidable technology player by almost any measure. It rakes in billions of dollars of revenue from its digital advertising businesses. It pushes boundaries with self-driving cars and Internet-connected contact lenses. But its reputation for being a consumer-oriented company has hindered its ability to attract enterprise customers to its cloud-computing offering. Google Cloud Platform is a science project at best, critics say. It's not something on which to bet a business.

"When will Google realize that cloud is more than an engineering problem?" asked Charles Fitzgerald, a former Microsoft executive turned technology consultant, in a January blog post. "If Google wants to build a real business where customers depend on it, it will have to do some critically important but mundane things that don't involve algorithms. Worse, it will likely involve fickle humans."

The company has already begun making moves. In November, Google named VMware co-founder Diane Greene as senior vice president of its enterprise businesses. Her hire (and scheduled keynote at the Google Next conference in San Francisco later this month)



"DEEPLY UPSETTING."

SOURCE: FACEBOOK

Facebook CEO **Mark Zuckerberg** reacts to Marc Andreessen's comments about India

ZUCKERBERG: UDIT KUSHRESHA—BLOOMBERG VIA GETTY IMAGES

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KEEP CLIMBING



sends an important signal to the industry: Google is deadly serious about the enterprise cloud. For prospective customers who are used to seeing Google launch and kill promising projects, it's a welcome message.

"Next will highlight the continued evolution of our customer offerings and bring more opportunities for businesses to make a seamless transition to the public cloud," says Carl Schachter, vice president of cloud platform in the Google for Work division.

Google's entry into the public cloud infrastructure business in 2012 was inauspicious at best. Microsoft had two years' headstart on the company. Amazon had six. As Google tinkered with different components of its eventual cloud platform, Amazon Web Services racked up thousands of startups and small-business customers and used them to eventually win over larger corporate accounts.

Meanwhile Microsoft, fully aware of its long-standing corporate relationships, developed a "hybrid" cloud strategy—put some things on its computers; keep other things on your own—that won over corporations afraid to stash everything in an Amazon-style public cloud. (Even today you can't run Amazon cloud services anywhere but in Amazon's own cloud.)

Fast-forward to 2016, and Google is in an unusual position: underdog. To compete with Amazon and others, it must build not only the cloud technologies that large corporations need but also the customer support services that they want. It's a knotty challenge for a company built to code, not comfort.

Dharmesh Thakker, a managing director at Battery Ventures who focuses on enterprise technology, says Google was "blowing smoke" about its enterprise cloud portfolio last year. This year is different—in part because Amazon finally exposed just how powerful its cloud business really is. For its fourth quarter, Amazon Web Services logged a profit of \$687 million on cloud services sales of \$2.4 billion. The \$10 billion run rate on Amazon's cloud business is just the spark that Google needs to light its competitive instincts.

Google will eventually win significant cloud business, Thakker says. In the meantime it can take advantage of its trailing position and play on latent uneasiness among execs who worry about placing too much of their budget into one company's cloud.

"Our strategy," says the chief technology officer of a large company with ties to both Amazon and Google, "is to avoid lock-in to Amazon as much as possible." **TS**



Q+A

JOHN LANDGRAF, CEO OF TV CHANNEL FX

Why do you hate Silicon Valley?

I feel ambivalent about Silicon Valley. Some of the most brilliant businesspeople the U.S. has ever known are there. I have a profound respect for many of them. But whenever an industry achieves the sort of mythic power that Silicon Valley has, I think there's a lot of falsehood and arrogance too. I like the light side of it like anyone else. It's the dark side that bothers me.

What's dark and what's light? If you take Netflix or Amazon, for example ...

I look at Netflix as a company that's trying to take over the world. I don't look at them as a company that wants to be a part of an ecosystem. I look at them as a company—like many companies in Silicon Valley—that want to own the ecosystem. Why do I hate Silicon Valley? I don't. What I hate is unbridled power.

You've called for transparency from companies like Netflix that don't release audience numbers.

It has been enormously advantageous for Netflix to not release that data. I respect what they have built. If I were them, I'd do the same thing. But as their competitor, my job is to call baloney. If you think Netflix doesn't release ratings because it wants to create a better creative environment for its employees, I've got a bridge I'd like to sell you. —*Michal Lev-Ram*



79% Submissions accepted on GitHub, a programming-code repository, when women did not identify their gender
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63% Share of submissions accepted on GitHub when women did identify their gender

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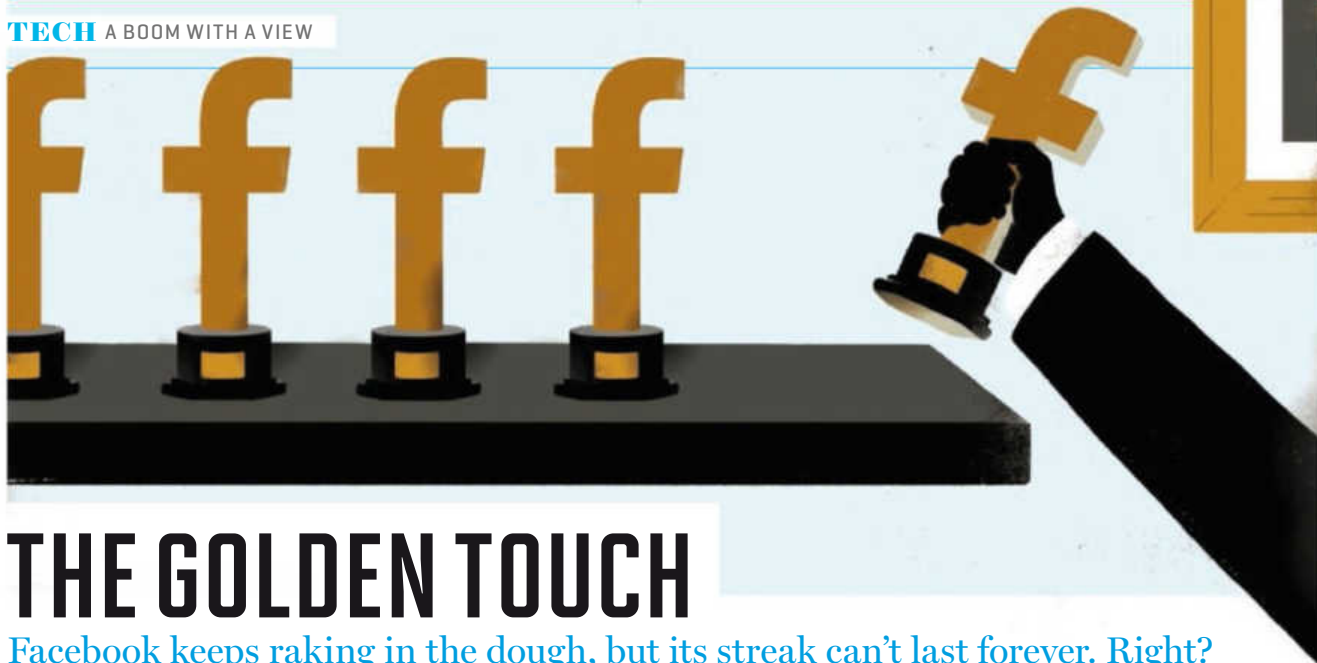


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THE GOLDEN TOUCH

Facebook keeps raking in the dough, but its streak can't last forever. Right?

By Erin Griffith

THREE YEARS after its botched IPO, Facebook is a Wall Street darling. (Blockbuster growth and profits for 12 consecutive quarters will do that for a company.) Investors traded shares of the company up 33% last year; the social media behemoth is now worth \$293 billion. The message is clear: Wall Street adores Facebook.

The sentiment is evident on Facebook's earnings calls. Analysts no longer use the opportunity to needle CEO Mark Zuckerberg about whether Facebook is still cool with teens or whether it can figure out how to sell ads on smartphones. (No need on the latter—mobile now makes up 81% of the company's revenue.) Instead they lob softballs. How expensive can its advertisements get? How big of a Scrooge McDuck vault should we acquire for all that sweet video coin that Facebook is going to mint? On a scale of one to totally, how much is Facebook dominating mobile advertising?

Of 51 analysts following Facebook, all but four rate the stock a buy or strong buy. It's to the point where, on Facebook's recent fourth-quarter earnings call, the biggest risk factor CFO David Wehner could muster was that it might be tough to beat last year's performance because it was so "remarkably strong." Facebook usually plays classical music before its earnings call, but it may as well blast "All I Do Is Win" by DJ Khaled. In Khaled's

parlance, Zuckerberg knows all the major 🗝️🗝️🗝️.

It's not unreasonable, then, to ask an uncomfortable question: Can Zuckerberg sustain his winning streak? With 1.6 billion people using Facebook each month, the company is running out of potential new users. Its lead in the mobile advertising market could shrink as Google and others quickly catch up. And Facebook's next generation of growth engines—Instagram, Oculus VR, Facebook Messenger, and WhatsApp—are only beginning to figure out how they'll make money. (The phrase "early days" is a favorite among execs.)

Generating revenue from Instagram will be a breeze—Facebook knows how to sell ads. Analysts estimate the

photo-sharing app could earn \$3 billion this year. But making money from other assets will be new territory for Zuckerberg and crew. WhatsApp, the messenger service it bought for \$19 billion in 2014, and Messenger, its homegrown app, are expanding into the unsexy business of customer support, which is new territory for Facebook. Making and selling hardware, as it plans to do with virtual-reality headset maker Oculus VR, is even further afield.

If I sound like a naysayer (or in Silicon Valley speak, a "hater"), consider how people soured on another tech darling. For a decade, Apple was imitated by competitors and idolized by market watchers. But throw in a disappointing Apple Watch launch and slowing growth in China, and suddenly good-as-gold Apple is a boring "value stock," paying dividends and buying back shares. Even fanboys can be fickle, it turns out. And investors? Forget it. 📉

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MARCH 1, 2016

Invest

INFRASTRUCTURE STOCKS

STOCKS TO REBUILD WITH

Congress is steering money toward highway and infrastructure projects again. Here's how investors can turn a construction boom into concrete gains.

By Ryan Drousseau

DETERIORATING, POTHOLE-strewn highways, collapsing bridges, and corroded, toxic water mains. Disasters waiting to happen, all aggravated by bureaucratic bumbling and inaction.

Discussions of the country's infrastructure can conjure dystopian images right out of Ayn Rand's *Atlas Shrugged*. While there's some hyperbole in

that conversation, there's no question that public investment in highways and utilities has declined. In dollar terms, public construction spending in the U.S. in 2015 was about the same as in 2007, and as a percentage of GDP, it stands at a two-decade low.

That's why some business leaders cheered in December when Congress finally passed the FAST Act, a \$305 billion transportation-

An ironworker scales a rebar cage on the Tappan Zee Bridge in Tarrytown, N.Y.

infrastructure bill. It also explains why civic leaders were encouraged by the attention brought to the nation's water arteries by the lead-poisoning crisis in Flint, Mich. After a long drought, a public construction renaissance may be underway. That will be important to the health of

the broader economy, and it will create opportunities for investors too—though they may need to venture into less familiar corners of the market to find them.

The FAST Act matters because it represents a long-term federal commitment to road-construction spending, with \$225 billion apportioned specifically for highways over five years. Highway spending had gotten a brief boost in 2009 from the stimulus bill passed during the depths of the Great Recession, but Congress hadn't enacted a major infrastructure measure since then. States rely on federal money for anywhere from 35% to 100% of their budgets for major highway fixes, so they have been unable to plan ahead, says Jim Tymon, chief operating officer at the American Association of State Highway and Transportation Officials. Now, Tymon says, they can take on more ambitious projects.

That said, it isn't easy to invest directly in such programs. Privately held contractors and public transportation agencies provide much of the materials and labor for big infrastructure undertakings. And for many manufacturers of construction equipment, new U.S. spending won't move the needle on earnings. Caterpillar, for example, gets just 8% of operating income from North American construction, and even in that category, an uptick in U.S. highway projects won't offset



President Obama at the Tappan Zee. The ongoing \$3.9 billion replacement of that bridge is the largest current U.S. highway project.

MORE PAY FOR PAVERS?

A new highway bill could help reverse a recent decline in public construction spending.



weakness in international markets and the energy sector. "Decline in oil and gas prices has made them into a no-growth business," says Morningstar analyst Kwame Webb.

For more concrete results, investors can turn to companies that make, well, concrete. **Vulcan Materials**, based in Birmingham, Ala., sells ready-made asphalt mixtures, and it's the largest producer of stone "aggregates" used in concrete. Those materials are pricey to ship long distances, which gives Vulcan a moat against competition, says Richard Lane, a manager at Broadview Opportunity Fund. Even during the Great Recession, Lane notes, Vulcan was able to steadily raise prices.

Vulcan has a significant market share in big states such as California, Florida, and Texas, where much of the new highway spending will be concentrated. Broadview sees revenue growing 10% to 14% annually for at least the next two years, up from \$3.4 billion in 2015.

Astec Industries, based in Chattanooga, is also in the paving business: It builds the portable machines that construction crews use to mix concrete and asphalt. Infrastructure projects account for 40% of Astec's roughly \$1 billion in annual revenue, and William Blair analyst Lawrence De Maria says new orders should start rolling in this spring. Sales of mixing machines in the U.S. stand at only 20% of their pre-recession peak. But Astec has gained market share, says Rick Whiting, another manager at Broadview, meaning it could get a big profit boost from even a small rebound in sales.

Investors can also buy stock in the engineering firms that design infrastructure projects, hire the contractors, and handle the paperwork. Here, as with



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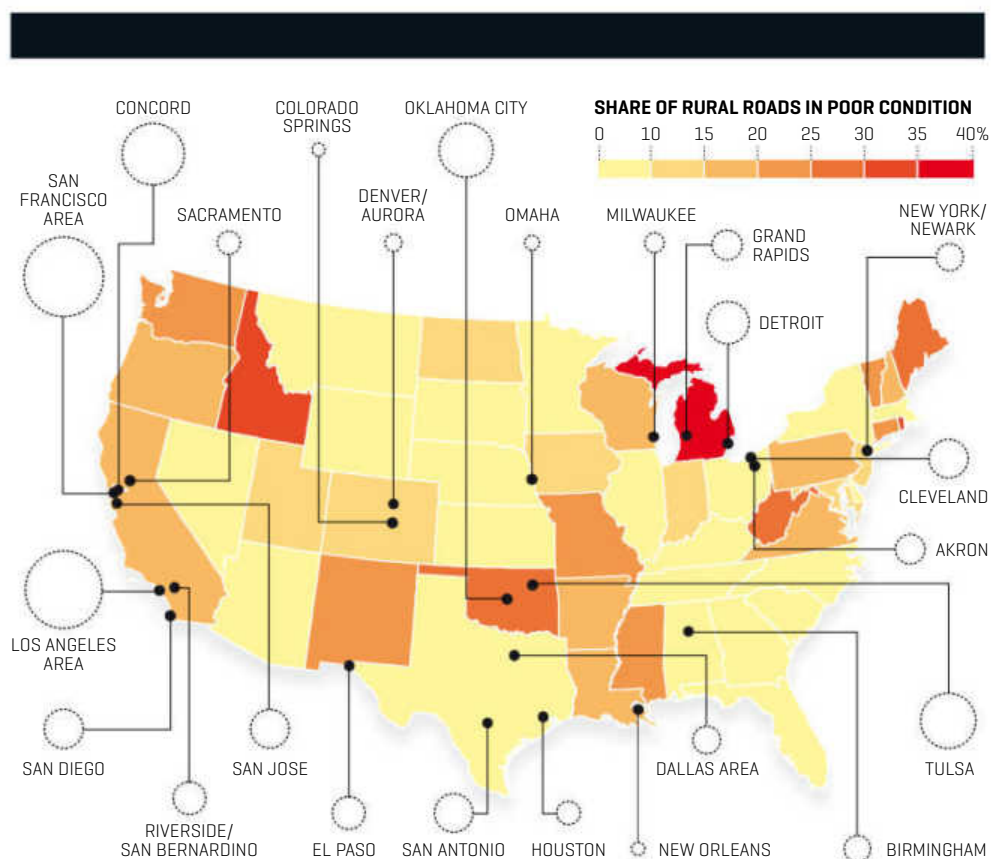
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equipment makers, many firms are highly diversified: For example, **Jacobs Engineering**, based in Pasadena, gets just 5% to 10% of revenue from U.S. infrastructure. But UBS analyst Steve Fisher says Jacobs's size—it had about \$12 billion in sales in 2015—allows it to tackle projects that smaller firms can't handle. Fisher estimates that the highway bill, along with an eventual turnaround in energy, will help Jacobs grow earnings 20% by 2018. Los Angeles-based **AECOM**, which has \$18 billion in annual revenue, may also see a boost from the highway bill, but Fisher singles it out for its extensive experience in water projects. That could lift the stock if Flint's troubles lead to greater spending on public drinking water infrastructure.

One thing the FAST Act didn't do: increase the 18.4¢-per-gallon gasoline tax that finances the Highway Trust Fund. Congress hasn't raised that tax since 1993; some transportation analysts believe it will turn instead to charging tolls on federal highways to help fund its share of future building projects. One provision in the highway bill encourages three states to run toll-collection test projects on federal interstates. Among the few public companies that run tolling operations in the U.S., **Transurban Group** is best poised to capitalize. The Australian company manages a tolled section of I-95



POTHOLE NATION

Bad road conditions cost the average U.S. driver \$516 a year in repairs and wasted fuel, according to TRIP, a transport research group. But in some locales, the price tag is far higher. Here, the country's biggest urban and rural trouble spots.

ADDITIONAL ANNUAL VEHICLE OPERATING COSTS AS A RESULT OF DRIVING ON ROUGH ROADS



near Washington, D.C., and could have the inside lane to capture more business if federal tolling becomes more common. That's a big "if," but investors can benefit from Transurban's 4.6% dividend while they wait.

Transurban is the largest holding of **Russell Global Infrastructure**, a mutual fund whose holdings are

split roughly 60/40 between foreign and U.S. stocks. The fund's other stocks include another toll-road company (Spain's Abertis Infraestructuras), railroads (including Union Pacific and CSX), and utility companies—along with pipeline operators like Kinder Morgan and Enbridge, whose stocks have been beaten down by the oil-price slump. The fund's definition of infrastructure obviously stretches far beyond highways and

water mains, and its annual expenses, at 1.47% of assets, are above average for an actively managed fund. But for investors who believe such companies are the skeleton around which future economic growth will be built, the fund represents a relatively simple way to get exposure to a wide range of stocks all at once. **B**

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Already the largest name in health care products and value-added services for dental, animal health, and medical practitioners, this New York-based firm continues to expand by giving back to society.

HENRY SCHEIN—which began life as a mail-order pharmacy in 1932—went public in 1995. Throughout this time, the company's commitment to doing well by doing good, in the spirit of enlightened self-interest, has grown along with the company itself: Each year, Henry Schein donates millions of dollars in products, cash, and in-kind services to organizations and initiates innovative public-private partnerships to help expand access to health care for the underserved.

“Our success has much to do with being in healthy and growing markets at the right time,” says Stanley M. Bergman, chairman and CEO. “But it also involves a commitment to be the leader in providing customers with the value-added solutions needed to enhance practice efficiency and the quality of patient care. What differentiates Henry Schein is an enduring commitment to our mission: We create long-term economic value while making the world a better place.”

Henry Schein offers more than 260,000 products, e-commerce solutions, and an array of value-added services all designed to help dental, medical, and veterinary practices operate efficiently and deliver quality care.

A leader in providing trusted digital solutions, Henry Schein is also committed to helping practitioners succeed through education. In 2015, the company announced support for an initiative of the American College of Prosthodontists Education Foundation to bring digital dentistry

and CAD/CAM technology into the dental school curriculum.

Through Henry Schein Cares, the company's global corporate social responsibility program, Henry Schein is “helping health happen” and generously supports underserved communities around the world through a myriad of programs, including the American Dental Association Foundation's Give Kids A Smile initiative; Healthy Lifestyles, Healthy Communities; Back to School; and Holiday Cheer for Children. In 2015, the company launched a program with Canine Companions for Independence to support volunteer puppy raisers and their veterinarians with essential products.

In 2015, one of the company's many recognitions included being named Corporation of the Year by the Association of Hispanic Healthcare Executives. Henry Schein's global relief efforts include a commitment to donate more than \$1 million in protective equipment to help prevent the spread of Ebola; product donations for flood victims in Malawi, earthquake survivors in Nepal, storm victims in South Carolina, and a typhoon-damaged veterinary school in the Philippines.

“Giving back to society and enhancing the communities in which we work and live is a key part of Henry Schein's DNA,” says Bergman. Underscoring the point, last year the company committed \$350,000 to World Vision for refugee relief. ●

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FORTUNE

BITTER SWEETS

BY BRIAN O'KEEFE

PHOTOGRAPHS BY BENJAMIN LOWY

For a decade and a half, the big chocolate makers have promised to end child labor in their industry—and have spent tens of millions of dollars in the effort. But as of the latest estimate, 2.1 million West African children still do the dangerous and physically taxing work of harvesting cocoa. What will it take to fix the problem?

MARCH 1, 2016 • FORTUNE.COM



THE BOY WITH THE MACHETE is watching us. We're sitting in an SUV in the middle of a rugged, red-dirt road about 10 miles outside the city of Abengourou, in eastern Ivory Coast. It's just after 8 a.m. on a Saturday, and the early morning haze hasn't yet burned off, so a mist hangs over the fields around us. We've been slowly bumping along on our way to meet some farmers in a nearby village called Appoisso but stop for a moment to take in the scene. Suddenly the boy is standing right next to us. He looks curious, but wary too.

We scramble out to greet him. In French my translator asks him his name. "Ibrahim Traoré," he replies. How old is he? "Fifteen."

Ibrahim is wearing ripped jeans, a worn, royal-blue Chelsea soccer shirt with the name of the team's sponsor—SAMSUNG—in large white letters across the front, and the same kind of clear plastic sandals that are everywhere in this part of West Africa. He holds his dusty blade casually against his left hip.

There's a sign behind him that appears to have been erected by the Ivorian government as part of a campaign to educate farmers about children's rights. **NON** it says in big, red letters. Then, again in French: "The worst forms of child labor." Below that is a drawing of a young boy carrying a huge sack of cocoa beans with a big X over it. Underneath is another sentence: "The place for children is in school."

Ibrahim tells us that he was born in Mali. He moved with his father to Ivory Coast when he was little—he's not sure exactly how old he was—and he's been working on cocoa farms ever since. What about school? No, he says, he's never been to school. Is the work he does hard? "Yes," he says deliberately. "It's very hard."

As we talk, a parade of younger boys, many holding machetes as well, walk by on their way to the fields. Ibrahim allows his eyes to follow them. After a few minutes he says it's time for him to



TALE OF A COCOA BEAN

A boy in Ivory Coast (TOP) carries a basket of freshly harvested cocoa seeds. The main harvest season for cocoa is from October through December. When the yellow and orange pods (FAR LEFT) are ripe, farmers cut them off trees with machetes or sickles. Workers break them apart (SECOND FROM LEFT) to extract the gooey white seeds (THIRD FROM LEFT), which are then piled up to ferment for a few days. Finally, the seeds are placed on drying racks (FAR RIGHT). When dry, they're ready to be exported and turned into chocolate.



“Nobody hates his own kids,” says one farmer. “We learned from the training that we have to do things differently.”

often from other former French colonies such as Mali and Burkina Faso, and held as slave laborers. In a documentary that aired on the BBC, filmmakers interviewed young boys in Ivory Coast who said they’d been beaten and forced to work long hours without pay. One who said he’d been working on a cocoa farm for five years was asked what he thought about people enjoying chocolate in other parts of the world. “They are enjoying something that I suffered to make,” the boy answered. “They are eating my flesh.”

For shocked consumers in the U.S. and Europe, the revelation that the Kit Kat bars and M&M’s they were giving their kids for a treat might have been produced by boys and girls in Africa who’d been robbed of their childhoods was tough to swallow. Many channeled their guilt into outrage at the likes of Hershey, Mars, Nestlé, and Cadbury.

The multinational chocolate makers are heavily dependent on West Africa. More than 70% of the world’s cocoa is grown in the region, and the vast majority of that supply comes from two countries: Ivory Coast and Ghana, which together produce 60% of the global total. The two nations have a combined GDP of around \$73 billion, according to the World Bank—or significantly less than Nestlé’s \$100 billion in sales last year. Yet the global chocolate business would be thrown into chaos without them. Last year, Ivory



Coast alone exported nearly 1.8 million metric tons of cocoa, or two-fifths of the world’s production. And demand for chocolate is going up, as a growing number of consumers in countries like China and India have more disposable income. The price of cocoa surged 13% in 2015 even as prices for most raw materials were dropping. Meanwhile the average farmer in each country still lives well below the international poverty line.

For the \$100 billion chocolate candy industry, the story of Ibrahim represents a serious problem—one that it has been vowing to fix for 15 years without great success, and which has gained new urgency in recent months.

Child labor in West African cocoa farming first became a cause célèbre around the turn of the century when a number of pieces of investigative journalism focused the world’s attention on the plight of children who had been trafficked to Ivory Coast to farm cocoa,

Coast alone exported nearly 1.8 million metric tons of cocoa, or two-fifths of the world’s production. And demand for chocolate is going up, as a growing number of consumers in countries like China and India have more disposable income. The price of cocoa surged 13% in 2015 even as prices for most raw materials were dropping. Meanwhile the average farmer in each country still lives well below the international poverty line.

The media coverage of child labor attracted the attention of U.S. politicians, who pressured the industry to tackle the issue. Former Sen. Tom Harkin, a Democrat of Iowa, and Rep. Eliot Engel, a New York Democrat, pushed the big chocolate



SPECIAL REPORT: BITTER SWEETS

makers to agree to eradicating the worst forms of child labor, as defined by the International Labor Organization's Convention No. 182, by July 1, 2005. The deadline for meeting the goals of the Harkin-Engel Protocol was then pushed back to 2008, then 2010—and then it was really extended. The industry is now working on its pledge in 2010 to reduce child labor in Ivory Coast and Ghana by 70% by 2020.

Though the most sensational stories about child labor over the years have focused on boys and girls who've been held against their will and abused, the more common story is similar to that of Ibrahim. Hundreds of thousands of children are used as free labor by their own families and often asked to take on dangerous tasks like harvesting with machetes or hauling 100-pound bags of beans. For many, school is not an option.

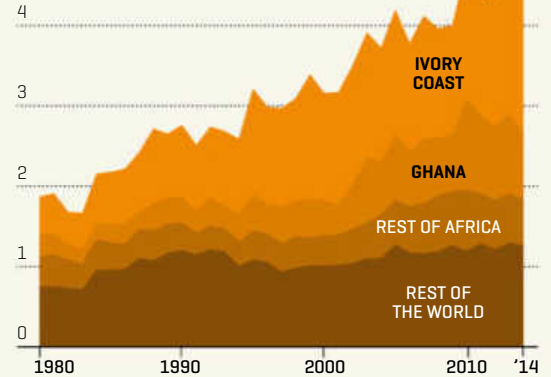
There's been a lot of activity on the corporate side in the years since the Harkin-Engel Protocol was signed, much of it in just the past couple of years. Virtually every name-brand chocolate maker has created or expanded its own sustainability program aimed at tackling the child labor issue by improving the lot of farmers—from Nestlé's Cocoa Plan to Mondelez's Cocoa Life to Hershey's 21st-Century Plan. And through the World Cocoa Foundation, an industry group, 10 of the largest chocolate companies created an ambitious program called CocoaAction in 2014. The plan, which has more than \$500 million in funding, aims to reach 300,000 farmers in Ivory Coast and Ghana with training programs to help them boost productivity—under the assumption that healthier economics for farmers will translate to better conditions for their children.

Unfortunately, progress has been slow—and by some measures the problem has actually gotten worse in recent years. Last July the Payson Center for International Development at Tulane University released the findings of a comprehensive survey of child labor in Ivory Coast and Ghana in the 2013-14 growing season. The research was funded by the U.S. Department of Labor as part of ongoing follow-through on the Harkin-Engel Protocol and built on a previous survey conducted by Tulane five years earlier.

The conclusions were not what the chocolate industry or the governments of Ivory Coast and Ghana wanted to hear. Tulane found that 2.1 million children had been engaged in inappropriate forms of child labor in Ivory Coast and Ghana combined—a 21% increase over the 1.75 million identified in its survey five years earlier. Of those, 96% were found to be involved in “hazardous activity.” The number of children re-

5 million tons

WORLD COCOA PRODUCTION



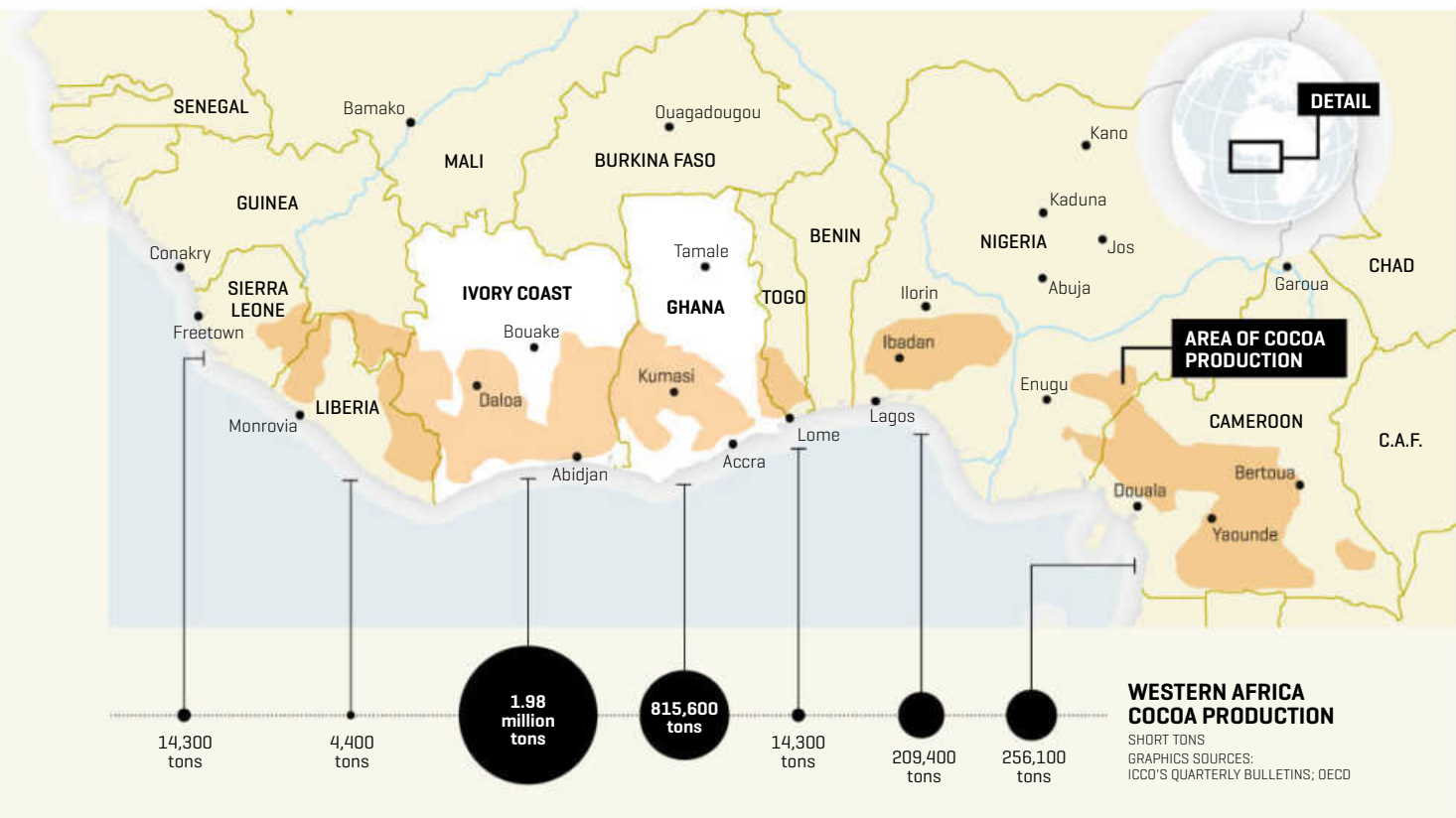
HOT COCOA

As global demand for chocolate continues to rise, so too does production. More than 70% of the world's cocoa comes from Africa. Sixty percent of the total crop is farmed in just two countries—Ivory Coast and Ghana. Though the price of the commodity has risen in recent years, farmers in West Africa still live in poverty.

ported to be performing dangerous tasks fell by 6% in Ghana but jumped by 46% in Ivory Coast.

There was immediate blowback. A batch of headlines proclaimed that child slavery was on the rise. And in September three California consumers, represented by the same law firm, filed class-action lawsuits against Hershey, Mars, and Nestlé, claiming they wouldn't have bought the products had they known the candy might be tainted by child labor.

Then, this February, the issue returned to the spotlight when the Supreme Court declined to consider whether to overturn a 2005 lawsuit brought against Nestlé, cocoa supplier Cargill, and Archer Daniels Midland (which got out of the cocoa business last year) on behalf of three unnamed boys who claim to have been trafficked to Ivory Coast and held as slaves. That cleared the way for the case to continue its slow progress toward a possible trial.



A Nestlé spokesperson says the company “looks forward to those proceedings in the lower courts and believes very strongly that the law and facts are on our side.” In a long statement to *Fortune*, a Cargill representative said that while the company is disappointed the Supreme Court chose not to review the case, it “believes strongly that this lawsuit is without merit.” ADM, which sold its cocoa and chocolate businesses to Olam and Cargill, respectively, in 2015, said it believes the lawsuit is “legally and factually meritless” and that it has a “strong defense and plan to vigorously defend the claims in court.”

As for the recent California class actions, the chocolate makers seem equally unruffled. Nestlé calls the suit against it meritless. Hershey did not address the specifics of the case but said it has “no tolerance for illegal practices, including children used as forced labor in cocoa farming.” Mars did not respond to our request for comment.

Despite the swirl of negative press, the chocolate industry argues that real gains are being made, and that the long lag time in producing results is understandable given the nature of the challenge. “I think your main question is, ‘Why is this hard to fix?’” says Nick Weatherill, executive director of the International Cocoa Initiative, a Geneva-based nonprofit funded by major chocolate makers that focuses on addressing child labor in cocoa in West Africa. “It is clearly a com-

plex problem that has its roots in poverty, and rural poverty no less. And if the problem is rooted in poverty, then the solution, in a way, is as complex as poverty eradication. And in the grand scheme of things, you know, 15 years on a journey of poverty eradication isn’t actually that long.”

Engel, who sees both “reasons to be encouraged and to be disappointed,” doesn’t disagree. On the positive side, he points to a rise in the number of children in both Ivory Coast and Ghana who are attending school. (In Ghana the attendance rate is up to 96%.) But Engel says he’s “not happy that so many children still seem to be working in hazardous conditions.” While he’s generally pleased with the efforts of the chocolate manufacturers, calling the industry “a good partner,” he says that “they need to be leaned on and prodded.” Given the results of the Tulane survey, he adds, “I need to prod them more.”

Are Nestlé, Hershey, Mondelez, and other chocolate companies really doing enough to fix the child labor problem? To try to answer that question, I traveled to Ivory Coast and Ghana in December to visit farming communities during cocoa’s peak harvest season. I saw examples of how investment in communities by companies and government can have a positive impact. But it’s also clear that much still needs to change.

I CAN HEAR THE MACHETES before I can see them. About 20 minutes after leaving Ibrahim, I’m following 41-year-old Bakary Koné down a path through his family’s cocoa farm outside



Children join farmers in breaking cocoa pods on an Ivory Coast farm in December. Nearly four in 10 kids on such farms suffered wounds or cuts during the 2013–14 growing season.



Appoisso, past coffee, avocado, and plantain trees to the spot where the harvest is going on. As we get closer to the cocoa trees, I can make out the rhythmic percussion of blades breaking flesh. Soon the source of the sound reveals itself. Nearly 50 men are sitting on logs in a circle around an enormous pile of yellow, orange, and brown cocoa pods. They methodically wield their blades to spear, break, and empty the fruit of the cacao trees, then toss the shells over their shoulders.

The men are local farmers who have gathered to help Koné break pods in return for a meal, as is the local custom. Cocoa has two harvest seasons. The main one happens from October through December, and farmers typically harvest ripe pods every two weeks or so during the season. There is a second, smaller harvest season in the late spring. When the pods are ready, farmers cut them off the trees with their machetes. For pods on higher branches they use a sickle, or *faucille*, with a

long, wooden handle (in Ghana it's often called a “go-to-hell”). The manual nature of the work makes it hard to automate. There are no industrial-size threshers in West African cocoa farming, or industrial-size farms for that matter. There are nearly 2 million cocoa-growing households in Ivory Coast and Ghana, and the average farm size is less than 10 acres. But the Koné farm is much bigger, about 120 acres, which explains why such a large group has assembled for this pod-breaking party.

A farmer wearing a small khaki hat and a purple long-sleeved shirt beckons me over. His name is Daouda Ouattara and he's 45 years old. Ouattara says he's a tailor, but he's been farming cocoa for four years. He gestures at me animatedly to sit down next to him and hands me a machete and a big yellow pod. “It's time for you to do some work,” he says in French, smiling, and demonstrates how to break the cocoa pod with one swift stroke. My efforts to imitate him are decidedly less confident. Worried about sinking the blade into my wrist, I take a few uncertain whacks at the fruit before

THE WORLD AWAITS.



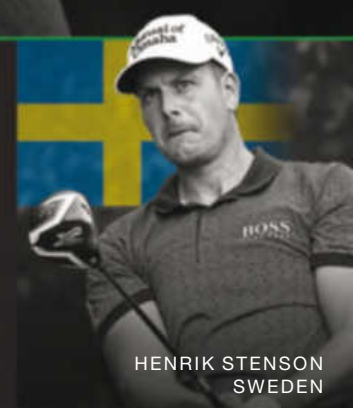
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A worker takes samples inside a greenhouse in Nestlé's R&D center in Abidjan. Since 2009, the company and its partners have given 5.2 million plantlets to farmers.

my new friend, cackling with laughter, tells me to stop. He jumps up and comes back with a stick for me to use instead.

Machetes are ubiquitous in rural areas of West Africa. At first it can be a bit unnerving to be surrounded by men, women, and children casually walking around with the swordlike tools. As culturally ingrained as the use of machetes is, it's one of the main factors that makes the process of cocoa farming dangerous for children. The Tulane survey found that 71% of children working in cocoa were exposed to sharp tools, and in Ivory Coast 37% of kids farming cocoa had suffered "wounds" or "cuts."

As the farmers relentlessly move through the pile of pods, they fill wooden baskets with the gooey white seeds drawn from each pod. Put one in your mouth straight out of the shell and suck on it, and it tastes a bit like lychee. But to turn them into proper cocoa beans requires a two-step process. First the seeds are piled up and typically covered with plantain leaves, then left to ferment for four or five days. After that they're moved to a drying rack and left for six or seven days. At that point they can be bagged and sold. If you bite them, they taste like very pure unsweetened chocolate.

Once the baskets are filled, boys line up and place them on their heads, carrying them about 75 yards to a clearing to dump them in a pile on a plastic sheet for the fermentation. On this morning it's about 90° F, and the humidity is sapping. Five boys, ranging in age from about 10 to 16, are making continual roundtrip journeys to the fermenting pile with little rest. At one point a younger kid in a Los Angeles Lakers shirt falters while trying to stand and lift the heavy basket above his head; a man helps him get his balance.

How, I ask Daouda, do they decide what is the right age for adults and children to do different jobs? He says that it's up to the workers, not the farm owners, to decide. "Here in Africa, the ones who are young and strong have to use their legs," he says. "The older ones get to work sitting down. But when it's time to sell the crop, the ones who are sitting down get to keep all the profits." He laughs at his joke as it's translated.

Daouda takes me over to a basket full of seeds and urges me to try carrying it. He gives me his hat, and

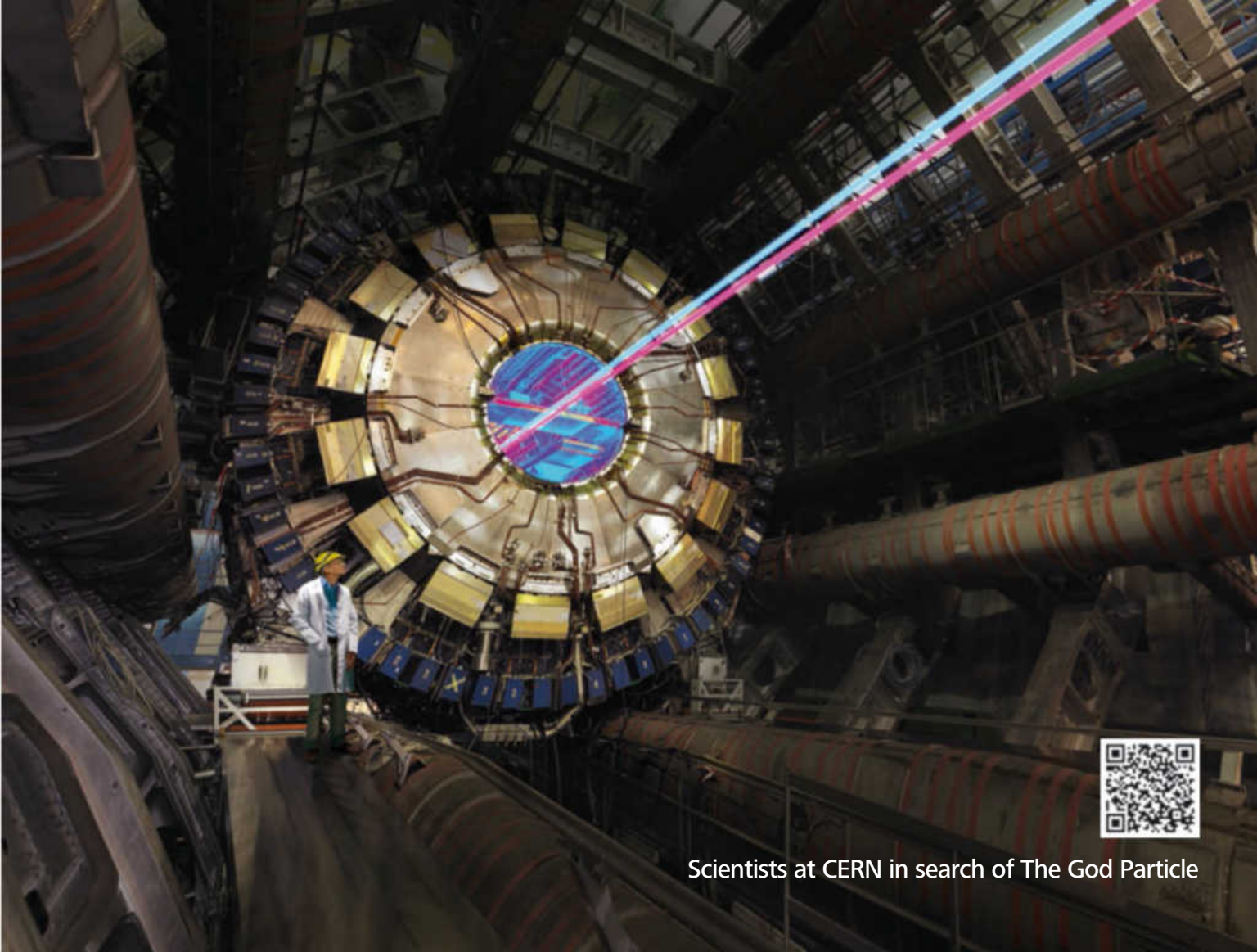
I hoist the basket onto my head. It's heavy, easily 25 pounds, and I wobble at first. Walking to the seed pile over uneven ground is no easy task in the heat.

Just before we leave I notice that a couple of young boys have joined the circle of men and are splitting pods with machetes. I point this out to Daouda and ask him if it's okay for boys that young to use machetes. "They have to learn how it's done properly," he replies. "Not like you." He chuckles again.

THE SENIOR POLICEMAN isn't sure what to do about the two boys. We're sitting in his office in Abengourou as he works the phones, trying to sort through their story and his options. "This issue is really complex," he says in French, shaking his head.

While we were visiting the Koné farm, our local guide got a call tipping him off that a pair of young men were passing through town in a taxi alone, and might be victims of trafficking. He alerted the police, who brought them in. The senior officer has come in on his day off to deal with the situation. He's wearing fashionable black glasses and a blue-white-and-gray plaid shirt buttoned all the way to the top. He has the two boys brought in. They claim to be 19 and 22, but, to our eyes, look a few years younger. Neither has any kind of ID. One is wearing a Barcelona soccer shirt and the other a Chelsea jersey. They stand defiantly, leaning against the wall, as the policeman ponders their fate.

It is notoriously hard to get accurate figures on trafficking. The International Labor Organization has estimated that about 21 million people in the world are victims of forced labor, and that some 5.5 million of them are children. Around the time of the Harkin-Engel agreement, it was frequently reported that some 15,000 children from neighboring West African countries were being held as slaves on farms in Ivory Coast. A survey overseen by the ILO in 2002 concluded that there were roughly 12,000 child laborers in Ivory Coast who had been trafficked.



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UNWRAPPING BIG CHOCOLATE'S PLANS

After years of promising progress, chocolate companies have recently stepped up their efforts to address child labor by providing more resources to farmers in West Africa. Here's what the five biggest industry players are doing.

MARS

**2015 CHOCOLATE
CANDY SALES:
\$14.68 BILLION**

In 2009 the privately held maker of M&M's and Snickers bars was the first global chocolate company to promise that by 2020 it would buy 100% of its cocoa from "certified" producers—farmers audited for sustainable and ethical practices. Mars says 50% of its cocoa will be certified in 2016.

MONDELEZ

**2015 CHOCOLATE
CANDY SALES:
\$14.45 BILLION**

A 2012 spin-off from Kraft, the snack specialist and purveyor of Cadbury chocolate announced in October a \$400 million investment to scale up its Cocoa Life program for training and supporting farmers. Partnering with chocolate manufacturing giant Barry Callebaut, it aims to reach 200,000 farmers in Ivory Coast and other countries by 2022.

NESTLÉ

**2015 CHOCOLATE
CANDY SALES:
\$12.49 BILLION**

The Swiss food giant and Kit Kat maker in 2009 committed more than \$100 million over 10 years to its Cocoa Plan, and earns plaudits in the industry for the program's holistic approach to training and supporting farmers. In 2015, Nestlé purchased 30% of its cocoa through the Cocoa Plan, and 83% of that supply was certified.

FERRERO

**2015 CHOCOLATE
CANDY SALES:
\$9.25 BILLION**

Known for Nutella and its Kinder line of chocolates, the privately held Italian company has joined other major chocolate makers in pledging that it will source 100% of its cocoa from certified farmers by 2020.

**Above:
Children in a
school built by
Nestlé near Divo
in Ivory Coast**

HERSHEY

**2015 CHOCOLATE
CANDY SALES:
\$7.34 BILLION**

The maker of the iconic Kiss got a later start than rivals like Mondelez and Nestlé. But through its 21st-Century Cocoa Plan, launched in 2013, the Pennsylvania chocolate giant got 50% of its cocoa from certified sources in 2015 and has pledged to make it 100% by 2020.

**SOURCE FOR
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Today activists and law enforcement officials broadly agree on two things about trafficking in West African cocoa farming. First, the traffickers have gotten much less brazen about it, and the numbers of children affected have probably fallen. Second, trafficking and forced labor in cocoa absolutely still go on.

"I think it's very clear that it's not as bad as I first experienced it down there in the sense that it has probably gone more underground," says Mick Moran, Interpol's assistant director in charge of human trafficking and child exploitation. But if you know where to look, says Moran, finding examples of children being held as forced labor in cocoa in each country is still like "shooting fish in a barrel."

Moran applauds the chocolate companies for pumping money into sustainability programs. But he's frustrated by a sense that the companies want to dismiss trafficking as a problem that is mostly solved. "I am disappointed lately in the cocoa industry," he says. "Who do they think they're fooling? They're not fool-

ing me, anyway, that's for sure."

Last year Interpol and the International Office of Migration worked with the governments of Ivory Coast and Ghana on a six-month operation focused on trafficking called Project Akoma. In June the authorities announced that they had liberated at least 48 children, ages 5 to 16, in raids near San-Pédro, a major cocoa region in the western part of Ivory Coast. Overall, Akoma has led to the freeing of more than 150 children and the arrests of 25 people accused of putting them in extreme work conditions.

Ivory Coast has passed legislation in recent years to make trafficking illegal, but people I spoke with in law enforcement in the country say that the government's intentions haven't yet translated into widespread education for prosecutors and police on how to recognize it or what to do about it. The U.S. Department of Labor's 2014 report on the worst forms of child labor in Ivory Coast found that the national police's anti-human-trafficking unit had an operating budget of just \$7,700, which it called "insufficient."

Poverty is clearly the main driver of trafficking.

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“You don’t take a chief to prison,” says one police official. “There’s also the social order to maintain. It’s a fine line.”

Farmers are in desperate need of cheap, controllable labor. But cultural issues are a factor as well. It’s not uncommon across West Africa for children to leave home at an early age, whether on their own or at the behest of their family, to seek better circumstances somewhere else. This is particularly complicated in Ivory Coast, which for decades has received a steady stream of migrants from other French-speaking countries such as Burkina Faso, Mali, and Togo.

The boys at the police station are from northern Togo. As far as the policeman can tell, they were brought to Ivory Coast through Ghana a few years earlier. Most recently they were working as household servants for the mayor of a city outside Abidjan. When they were intercepted in the taxi, the boys were on their way to work for Togolese migrant farmers in a village near Abengourou. But the big boss, says the police officer, is the chief of the village, who owns the land. The policeman says that the chief is known to bring in a lot of young people from outside the country to work on his farms.

What would it take, I ask the officer, to bring charges against the chief if there was evidence that he was involved? The officer smiles ruefully. “You don’t take a chief like this to prison,” he says. “There’s also the social order to maintain. It’s a fine line.”

WHEN OUR SUV ROLLS INTO Gazolilie, the welcoming committee is waiting. A group of about 20 women, many wearing brightly patterned dresses or skirts, quickly surrounds us and begins clapping and singing while one of them bangs out the beat with a stick and a pot. It’s a catchy tune, and the meaning of the lyrics, I’m told, couldn’t be more positive: “It is good to love your children.”

I’ve traveled to this tiny farming village outside the city of Lakota—about 120 miles from Abidjan in south-central Ivory Coast—to see how Nestlé is implementing its Cocoa Plan. One of the core strategies of the program is to empower women. And the farmers’ wives who have greeted us in song have formed their own group, with support from the International Cocoa Initiative, to grow cassava as a cash crop separate from the cocoa fields that their husbands control.

Nestlé gets cocoa from dozens of farm co-ops across

Ivory Coast encompassing tens of thousands of farmers. But the chocolate giant doesn’t buy the beans directly. Farmers sell to a government-licensed buyer, usually a big commodities supplier. The farmers in Gazolilie, for instance, are part of a union of cooperatives in the Lakota area with about 4,100 members, and U.S.-based Cargill buys their beans. Nestlé says its Cocoa Plan has three “pillars”: to enable farmers to run more profitable farms; to improve social conditions and thus eliminate the factors that lead to child labor; and to boost the long-term supply of sustainable, quality cocoa.

That last point is not insignificant. As demand rises, the industry is concerned about being able to source enough cocoa in the future, for a variety of reasons. One is urbanization: More older children and young adults in West Africa are moving to cities and giving up on the agricultural way of life, including cocoa farming—a trend that was highlighted in the Tulane survey. A second factor is disease. Each year up to 40% of the global cocoa crop, by some estimates, is lost to pests and diseases like swollen shoot and black pod.

A third problem is aging trees: Cocoa plants have their peak production between the ages of five and 25, and then begin to decline. The average small farmer has no means for purchasing new trees. Nestlé operates an R&D center on the outskirts of Abidjan that, along with its partners, since 2009 has given 5.2 million plantlets to farmers in its supply chain and now has the capability to grow more than 1.5 million plantlets per year. The new trees are bred to produce yields three times bigger than existing trees.

Like most of the major chocolate companies, Nestlé has been increasing the amount of beans it buys that are “certified” as sustainably grown. The farmers in certification programs are trained in best practices—how to properly use pesticides and fertilizers, for instance—and sign a pledge not to exploit child labor. In 2015, Nestlé says, it purchased 121,000 tons—or 30% of its total—from farmers in its Cocoa Plan, and 83% of it was certified. The company says it trained 32,000 farmers last year. The co-op in Lakota works with UTZ Certified, one of the biggest certification organizations (others include Fairtrade International and Rainforest Alliance). More than half of the farmers in the co-op have gotten certified and those who are can earn bonuses on every ton of beans sold.



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ICI has been helping the Lakota co-op implement a child monitoring and remediation system funded by Nestlé. The union employs a child labor agent to educate farmers and keep an eye out for abuses. To “sensitize” farmers about the possible downsides of putting their kids to work, the agent goes door to door with a flip board with colorful illustrations showing children engaged in dangerous activities (burning fields, swinging machetes, hauling heavy bags) and the potential injuries (horrible hernias, back pain). It appears to work.

A farmer named Armand Gnekpie tells me that before he joined the co-op a few years ago and went through the education, he had no idea that people from outside Ivory Coast were worried about children being put to work in the cocoa fields. Gnekpie is sitting with his wife and five children, ages 2 to 10, on the front porch of the cement-block house his father built. There is a mud hut kitchen nearby. Gnekpie, 32, grew up farming cocoa but says he moved to Abidjan for a few years before returning to take over his family’s land. He has about 10 acres and grows mostly cocoa and a little coffee.

Did it ever occur to him before, I ask, that doing heavy work might not be healthy for children? He pauses before answering, a pained expression on his face. “Nobody hates his own kids,” he says. “We learned from the training that we have to do things differently.”

The sensitization work may be effective in communities where it’s implemented, but there is a question of scale. When Tulane conducted its first survey in 2009, it found that less than 5% of children in farming communities had benefited from an outreach project. That line of inquiry was dropped in the more recent survey. Even if Cocoa Action reaches its goal of engaging 300,000 farmers, it will fall well short of touching the majority of farm households in West Africa.

Since 2012, Nestlé has built six new schools in the Lakota area and a total of 42 in Ivory Coast. In a village called Gnakpililie it funded a three-classroom addition to an existing school. Inside the cream-and-black concrete building, 30 or so students per room sit at wooden desks. The boys wear khaki uniforms, and the girls are in blue and white dresses.

The results of some informal polling are informa-

tive. More than half of the kids in one class have heard of Beyoncé, but just one can name the U.S. President. I ask another class how many of them have ever used the web; none raise their hands. How many of their parents are farmers? Almost every hand goes up. How many of them want to be farmers? None volunteer. After a moment, one young boy raises his hand and says something in French when called on. “I want to sit in an office,” he says. “It’s too hot to be a farmer.”

LAST OCTOBER, VOTERS in Ivory Coast handily reelected President Alassane Ouattara to a second term. The pleasant surprise was that there was no tumult in the wake of his victory. When Ouattara won his first term in 2010, it plunged the country into months of civil crisis. His predecessor and longtime rival, Laurent Gbagbo, claimed election fraud and refused to leave office until being captured by pro-Ouattara forces. The chaos of the conflict—which followed a civil war in the country that lasted from 2002 to 2007—wasn’t exactly conducive to addressing the tough societal problems that lead to child labor abuses.

Since assuming office the President has taken steps to boost cocoa production and reduce the risk of a boycott or embargo on his nation’s leading export. Ouattara, 74, who holds a Ph.D. in economics from the University of Pennsylvania and is a former senior official at the IMF, clearly recognizes that a healthy cocoa industry is key to growing Ivory Coast’s economy. (Cocoa beans accounted for 20% of exports in 2013.) He formed a new Coffee and Cocoa Council to manage the export of beans and offer a guaranteed price to farmers each year. Stability has helped. In the five years between the two Tulane surveys in 2009 and 2014, cocoa production in Ivory Coast surged 40%.

Ouattara has gotten an assist from world markets, too, which have driven prices higher. “If the people reelected President Ouattara with 83% of the vote,” says First Lady Dominique Ouattara, “it is mainly due to the fact that farmers are very happy.”

To address his country’s child labor image problem, the President chose his most high-profile and trusted adviser: his wife. In 2011 he named her chairperson of a new committee in charge of supervising efforts by the chocolate industry and coordinating them with government programs. Having the First Lady take on the child labor problem as her top priority sent a clear signal that the new government was treating the issue seriously.

“When we started, we realized that the chocolate industry had no coordination,” says Mrs. Ouattara, speaking in French. “Each company had its own program. At the government level also there was no coordination.”

We’re facing each other from opposite ends of a blue sofa in a perfectly appointed sitting room in the President’s residence, located in a leafy section of Abidjan

WHERE LEADERS OF SCALE-UPS...MEET-UP

"...TO SUCCEED, MAYBE EVEN TO SURVIVE, IN THE NEW ENVIRONMENT, ORGANIZATIONS AND LEADERS MUST FUNDAMENTALLY CHANGE." —General (Ret.) Stanley McChrystal



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A farmer in Ghana inspects sacks of dried cocoa beans that are stored in a small locked structure.



known as Cocody. Through sliding glass doors a large pool area flanked by white columns is visible, and a couple peacocks wander by as we talk. The First Lady, who was born in Algeria, is wearing an elegant, long navy gown, and her blond hair is perfectly coiffed. In addition to being a political spouse, Mrs. Ouattara is a successful businessperson and the founder of a multinational real estate firm.

Mrs. Ouattara heaps praise on Tom Harkin and other U.S. officials for bringing attention to child labor and helping instruct her on the issue. “Before I had the feeling that the big companies didn’t really care much about this issue,” says Mrs. Ouattara, who has an infectious laugh. “Now I can tell that they have changed the way they think about it, and they’re cooperating very much.”

She says that she and the President have focused on education as a way to create options for children. “When I took over this job, I was surprised to learn that school was not mandatory in Ivory Coast,” she says. The gov-

ernment has built more than 17,000 new classrooms since 2011, and in 2015, Ivory Coast passed a law making school compulsory for children between 6 and 16. The effort has worked: The Tulane survey found that 71% of children attended school, up from 57%.

When other aspects of the Tulane survey come up, the First Lady’s eyes darken a little, and she purses her lips. Mrs. Ouattara is not happy with the headline numbers in the study or the way it was conducted, despite the fact that Tulane partnered with ENSEA in Ivory Coast and conducted its research using International Labor Organization definitions for child labor. She points out that a child who was found to have engaged in hazardous activity for one day in the previous year was counted the same as one who was working in the same conditions every day. The numbers in the report don’t give an accurate picture, she argues, and says that the survey “brought a lot of confusion.”

I ask her if she plans to push for changes in the methodology when Tulane conducts the next survey. “If they



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do it next time,” she corrects me in English. Shortly after, I learned that Tulane had lost the contract for the next survey to the National Opinion Research Center at the University of Chicago. William Bertrand, the Wisner Professor of Public Health at Tulane, who led the previous surveys, believes his group lost out on the next one largely because of politics. “We try to avoid politics in science to the extent that we can,” he says.

THE N6 HIGHWAY NORTH from Accra to Suhum might as well be the road to salvation. Ghana is a heavily Christian nation—more than 70% of the population identifies as one type of Christian or another—and the spirit of the times feels distinctly evangelical. Billboard after billboard advertises mega-sermon events (“Night of Bliss With Pastor Chris,” “Night of Prophecy and Power”), and taxis display religious sentiments on their rear windows in ornate yellow letters ranging from celebratory (JESUS JESUS JESUS) to humble (IT WASN’T ME BUT GOD). A sky-high youth-unemployment rate and erratic electrical service, among other factors, have people here searching for answers of late.

We exit and twist around a series of dirt roads for about 10 minutes. But it’s just after we pass a hut with a sign identifying it as the God Is Love Fashion Center that we realize

we’re officially lost. My host for the day, Matilda Broni, the community development manager for Mondelez’s Cocoa Life program here, makes a phone call for directions, and pretty soon we arrive in a farming village called Otwebediadua, which in the local dialect means, “The antelope will eat the fruit and also plant it.”

The 1,500-person hamlet is one of the 446 farming communities in Ghana, comprising 28,000 farmers, where Mondelez has implemented Cocoa Life since launching the effort in 2012. More than half of those communities (237) were added just in 2015. Mondelez has a long history in Ghana—at least indirectly. Cadbury has been sourcing cocoa from the former British colony for more than 100 years. In 2010, Kraft Foods acquired the chocolate maker. Then, in 2012, Mondelez (including its Cadbury unit) was spun off from Kraft as the world’s biggest chocolate business. Similar to Nestlé’s Cocoa Plan, the approach of the Cocoa Life program is to invest in training farmers in farming practices and supplying them with resources while at the same time educating them about the proper roles of children.

Roughly 30 men and women are assembled and sitting on blue-and-green plastic chairs under a sheet-metal roof at the village’s community open-air gathering spot. To one side, some 15 students are sitting in wooden desks they’ve hauled out from the nearby schoolhouse.



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Speaking in their local dialect, the elders explain that the training and support they've received has helped them improve crop yields and think of farming as something other than a subsistence living. "Before Cocoa Life came, we didn't think about cocoa as a business," says one man.

When the subject turns to child labor, the conversation becomes more spirited. The concept has become controversial here for a surprising reason. One older man in a faded black suit jacket and a yellow T-shirt becomes extremely animated and begins complaining that ever since the village went through the sensitization program, the children claim that every chore is "child labor"—sweeping, fetching water, etc. "It's causing problems," he says. "What exactly is child labor?" Amid laughter, he demands that I define it for the students so that they'll hear from an American journalist what they are and aren't allowed to do.

It's a lighthearted moment, but raising awareness is only part of the formula for solving child labor. I think of my visit to another village in a different part of Ghana the day before. When I asked the farmers there if the rise in the price of cocoa had made life easier, they began talking about all the things they needed—a health clinic, a computer for the school, electricity. "If you are talking to the chocolate company," one of the elders says, "tell them we are suffering here."

That's a fact that can be substantiated with more than anecdotes. According to the 2015 edition of the Cocoa Barometer, a biennial report examining the economics of cocoa that's published by a consortium of nonprofits, the average farmer in Ghana in the 2013–14 growing season made just 84¢ per day, and farmers in Ivory Coast a mere 50¢. That puts them well below the World Bank's new \$1.90 per day standard for extreme poverty, even if you factor in the 13% rise in the price of cocoa last year.

And in that context the challenge of eradicating child labor feels immense, and the chocolate companies' newfound commitment to expanding the investments in cocoa communities not quite sufficient. "The thing is, if you add up all of the work these projects are doing and the work by governments and development agencies, it actually doesn't even scratch the surface of the size of the problem," says Antonie Fountain, managing director of the Europe-based Voice Network and a co-author of the Cocoa Barometer. "Best-case scenario, we're only doing 10% of what's needed."

Getting that other 90% won't be easy. "It's such a colossal issue," says Sona Ebai, who grew up farming cocoa in Cameroon and is the former secretary general of the Alliance of Cocoa Producing Countries. "I think child labor cannot be just the responsibility of industry to solve. I think it's the proverbial all-hands-on-deck: government, civil society, the private sector." He pauses, taking in his own thought for a moment. "And there, you really need leadership." ■



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“The only thing moving faster than technology is consumer expectations.”

JEFFERY W. YABUKI
PRESIDENT AND CEO

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RAPIDLY CHANGING consumer expectations and new technologies have had a dramatic impact on financial services in just a few short years, and Fiserv has played a substantial role in helping banks and credit unions manage the resulting turbulence.

Fiserv President and CEO Jeff Yabuki says it's only the beginning.

“The industry is in the early stages of a major transformation in the way it delivers services,” says Yabuki, who took the helm of the company in 2005. “The only thing moving faster than technology is consumer expectations.”

Those rising expectations, coupled with powerful mobile devices in the palms of people's hands, are at the heart of the disruption—and the opportunity to create new value for financial institutions, billers and consumers.

“We as consumers expect everything to be fast, instant and easy to use,” he says. “Fiserv focuses on helping our clients create essential experiences — the things so useful people can't imagine living without them.”

Over the years, the company has had a track record of delivering what Yabuki calls “purposeful innovation.” This includes pioneering online bill payment, mobile banking and electronic person-to-person

payments to, more recently, offering a secure app for withdrawing cash from an ATM—sans card.

The company is constantly monitoring the disruption for opportunities on behalf of its 13,000 clients, such as investing in emerging technologies like bitcoin, and supporting an accelerator program for promising fintech companies interested in partnering with banks and credit unions.

At the same time, there are a number of new fintech entrants that are challenging traditional providers. Yabuki points out long-standing financial institutions have a distinct marketplace advantage over these so-called disruptors.

“One of the important differences between these institutions and their new digital competitors is that banks and credit unions see their customers as customers for life, while some digital competitors are only in it for the transactions,” Yabuki notes. “By contrast, our clients range from the largest banks to neighborhood financial institutions that are part of the fabric of their communities, and we stand behind them as they work to help their customers achieve their dreams.”

Fiserv is happy to operate behind the scenes in this way, says Yabuki. “We're not looking for headlines. We aspire to make our clients the heroes.”

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The Man Who's Re-(Re-Re-)Inventing J.C. Penney

MARVIN ELLISON WORKED HIS WAY UP FROM SECURITY GUARD AT TARGET TO CEO AT PENNEY BY MASTERING THE DETAILS OF RETAIL. BUT AS PENNEY'S TWO PREVIOUS CEOs FOUND OUT THE HARD WAY, IT'S GOING TO TAKE SOME FANCY FOOTWORK TO RESTORE THE ICONIC DEPARTMENT STORE'S LUSTER.

By ***Phil Wahba***

Photographs by **NANCY NEWBERRY**

Marvin Ellison at the J.C. Penney store in Frisco, Texas, a retail "living lab" where the chain tests changes in product offerings and sales-floor layout.

QUESTION: IF YOU WANTED TO BUY A PAIR OF MEN'S SHOES AT A DEPARTMENT STORE, WOULD YOU LOOK FOR THEM NEXT TO

[a] Men's Clothing, or [b] Women's Footwear?

Most shoppers would probably answer "a." But at J.C. Penney, the 114-year-old retailing mainstay, the answer until very recently was "b." Women make up about 80% of Penney's clientele, and Penney managers believed that, generally speaking, those women were likely to buy shoes for their spouses and beaus, just as they did during the Kennedy administration.

"It was a terrible idea," says Marvin Ellison, shaking his head as he walks a reporter through a Penney store in Frisco, Texas. "It took space away from women's shoes, and it made it very difficult for men to want to buy shoes."

Ellison, Penney's newly minted 51-year-old CEO, had a better idea. He ran a test to see whether men's shoes would sell faster when showcased next to, say, men's suits; once the data showed that they did, he instituted that change last summer across the company's 1,000-plus stores. Since entrusting guys to buy their own brogues and boots, Penney has seen double-digit sales gains in footwear. "That reset has been one of the smartest things we've done," says Ellison.

This Frisco store, not far from company headquarters in Plano, north of Dallas, serves as Penney's retail living lab, and as he continues the tour, Ellison proudly points out similar changes. Fashion jewelry now sits closer to its Liz Claiborne apparel brand, so women can try on accessories to go with a dress they might buy. The decor has been gussied up at the store's traffic-driving in-house salons. Handbags got a face-lift too. After Penney failed to cash in on the recent handbag boom, managers did a deep-dive market analysis. Ellison's conclusion: "Our handbags were ugly. We had to change them." (It sounds less harsh in Ellison's gentle Tennessee baritone.)

As the adage goes, "Retail is detail." And if the details Ellison is addressing seem forehead-slap obvious, signs of how far J.C. Penney had fallen behind its rivals—well, welcome to his world. Ellison became CEO last August with a mandate to plug the store's countless leaks in operations, strategy, and technology, problems left over from the chain's nearly fatal attempt to reinvent itself four years ago. He and Penney's board are betting that such small



BIG BRANDS Major revenue drivers at Penney include popular brands like Liz Claiborne (which it owns) and Levi's, as well as its rebranded hair salons.

but meaningful improvements will add up to a full recovery.

That now-infamous overhaul, under then-CEO and former Apple retail guru Ron Johnson, sought to reposition Penney as a flashier retailer with fancier merchandise. But it backfired: Customers fled, sales tumbled by almost a third, and Penney was crippled financially. Three years ago the board brought back Mike Ullman, the CEO it had unceremoniously chased out in favor of Johnson, to stop the U.S.S. *Penney* from sinking. And last summer he handed the reins to Ellison—an executive the opposite of flashy.

It's fitting that Ellison, a lifelong musician, plays electric bass, an instrument that rarely gets a flashy solo but without which no band can click. He made his reputation in retail at Home Depot, helping engineer that chain's turnaround by focusing on unsexy but primordial things like the supply chain and the integration of stores and e-commerce. He's a data devotee who grounds every decision in information—including that seemingly intuitive shoe move. "Pure intuition without



any data gets you in trouble,” Ellison says. Referring to the Johnson era, he adds, “We went through 18 months of that, and we’re not going to do it again.”

Ellison’s early results are encouraging. Penney reported a 3.9% increase in comparable sales during the 2015 holidays, one of the best performances in retail that season. (Rival Macy’s saw “comps” shrink by 5.2%.) That followed seven quarters of sales growth in the previous eight. And although Penney hasn’t reported a profit since 2010—and hasn’t predicted when it will again—it’s aiming for \$1.2 billion in Ebitda (earnings before interest, taxes, depreciation, and amortization) for fiscal 2017, nearly double the level of fiscal 2015.

The trees look nice, but the forest is daunting. Penney’s sales, an estimated \$12.6 billion for the just-completed year, are still down 37% from their 2006 peak. Its nascent recovery, part of its fourth turnaround effort since 2000, hasn’t swayed Wall Street—its stock trades close to a 35-year low. In the long term, the problem isn’t just that Penney has been dysfunctional; it’s also that Penney is a department store, a practitioner of a business model under siege. It faces hordes of competitors in its core apparel and home-goods businesses: department-store rivals Kohl’s and Macy’s; Target and Walmart; discounters

like T.J. Maxx; and, of course, Amazon. And consumers, especially younger ones, have lost interest in browsing at the mall. “The struggle is not going to end,” says Mark Cohen, director of retail studies at Columbia Business School. “The traffic that is off isn’t coming back.”

Ellison’s response has been to make Penney smarter and more efficient at keeping customers loyal and selling more to each one. That means embracing Penney’s mall-ness—and trusting that there’s still a place in the retail landscape for a mid-market department store. And if that means playing catch-up for a few years before making bigger, bolder moves, so be it. “We’re going to start with the foundation: No one can beat us being us,” Ellison says.



URNAROUNDS ARE NOTHING NEW at J.C. Penney. Founded in 1902 as a Wyoming dry goods store, Penney became one of the 20th century’s biggest department stores and catalogue retailers, dominating middle-American towns and suburban malls. But sales began to erode in the late 2000s. Penney was slower than rivals

to emerge from the Great Recession and struggled with shrinking profit margins in its apparel business.

This was the situation Ron Johnson was hired to turn around. In 2012 he began a sweeping transformation aimed at shedding Penney's stodgy image. He dumped its coupon program and changed everything from the logo to the checkout process. Most notably, he tried to make Penney hipper. Johnson dropped or de-emphasized several profitable in-house clothing and home-goods product lines, while trotting out cheaper versions of upscale brands like Michael Graves and Bodum.

The results have been widely chronicled (including in *Fortune's* pages): The makeover bombed, sales plummeted, and some 40,000 jobs were eliminated. (Johnson declined to comment for this article.) In the spring of 2013 the board ousted Johnson and rehired Ullman, but the worst damage was done. The chain's inventory management and e-commerce operations were in chaos, and Penney ended up with some \$5 billion in long-term debt. The hindsight consensus was that Johnson had dismissed Penney's core shoppers: middle-income suburban moms with neither the inclination nor the budget to worry about being cutting-edge.

If anybody can relate to those customers, it's Marvin Ellison. Ellison, one of only five African-American CEOs in the *Fortune* 500, grew up in Brownsville, Tenn., a two-stoplight town between Memphis and Nashville that was segregated well into the 1980s. He's one of seven children, and his family was poor. His father at

BASS OF SUPPORT

The Ellison family, shown here in 1979, performed as a gospel act, in outfits bought at J.C. Penney. Marvin, with bass guitar, stands at the far right.



one point worked three jobs at once, too proud to take government assistance. Still, the Ellison family would shop twice a year at J.C. Penney, first for back-to-school clothes and then at Christmas. The family also performed as a gospel act—and got its stage outfits there too. “Going to J.C. Penney was a big deal. It was something we looked forward to,” his older sister Virginia recalls.

Marvin's father, an honors student, had to drop out of high school to support his family after Marvin's grandfather suffered a heart attack at harvest time. The senior Ellison saw education as a way out of poverty and imparted a deep love of reading to his kids. Marvin developed big ambitions at an early age: The books he likes best are biographies of Presidents; Harry Truman is his favorite. He met his wife, Sharyn, when both were students in the 1980s at what's now the University of Memphis. (He later earned an MBA from Emory, in 2005.) Sharyn, 47, says Marvin caught her eye as the only young man on campus toting a briefcase rather than a backpack. Date nights early on revolved around episodes of *Dallas*, the ultimate business soap opera.

Ellison's retail career started during college, almost by accident. To help pay for books and rent, he took a part-time job as a security officer at Target at \$4.35 an hour. That gig turned into 15 years at the retailer, as he climbed the ranks in theft prevention. Those early jobs gave Ellison a close-up view of how retail works at the store level, everything from the cadence of markdowns to the science behind keeping shelves stocked. But the jobs also taught him something that would shape his management style: Too many managers don't listen to the troops on the frontlines, the workers in stores. Ellison had tons of ideas but didn't share them with managers, he says, because they wouldn't ask.

“Too many CEOs in retail like to be the smartest person in the room,” says Home Depot co-founder and former CEO and chairman Bernie Marcus. “Marvin's not like that.” After Ellison joined Home Depot in 2002, he promptly sought advice from Marcus, who had recently retired. The two went on store visits three or four times a year to talk strategy and culture. Home Depot soon went through its own crisis, enduring lagging sales and plummeting morale under CEO Bob Nardelli. After Frank Blake replaced Nardelli in 2007, Blake became another advocate for Ellison, eventually naming him head of U.S. stores.

Blake credits his former protégé with helping fix

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Home Depot's dismal customer-satisfaction ratings and turning the company from an e-commerce laggard into a leader. He also praises Ellison's knack for galvanizing workers. In one memorable innovation, Ellison launched a weekly video feature on Home Depot's internal TV station that showcased customer-service success stories. Blake compares them to ESPN's SportsCenter highlights: "They provided a 'Wow, that's amazing' element to work so that people could see how impactful their work could be... It makes the associates stars."

"Everyone on the board knew Marvin would end up running a major retailer," adds Blake. But it wasn't to be at Home Depot. In 2014 the company chose Craig Menear to succeed Blake. Menear had been the chain's chief merchant, which meant he had an edge Ellison lacked: extensive experience deciding which merchandise to sell and working with buyers to spot promising products. Such "merchant princes" tend to dominate the corner office in retail: Former top merchants currently run Kohl's and Macy's.

But that résumé gap didn't stop Penney's board from approaching Ellison that summer to be its future CEO. Mike Ullman, who was instrumental in the search, says that while Ellison may not know merchandising inside and out, he is self-aware enough to surround himself with people who do. "He knows who he is and exactly what he wants to accomplish," Ullman says.

PENNEY ANNOUNCED Ellison's hiring in October 2014, and since then Ellison has conducted more than 60 employee town halls and visited 100 stores. In a relatively uncommon hiring agreement, Ellison was designated to become CEO, but first would spend nine months as president under Ullman. The two men traveled the world, visiting vendors and partners so that Ullman could give Ellison a crash course in areas he was less familiar with, like apparel factories, sourcing, and merchandising. The Ullman-to-Ellison CEO hand-off took place last August, but even today Ellison is constantly listening and watching, taking the measure of his colleagues.

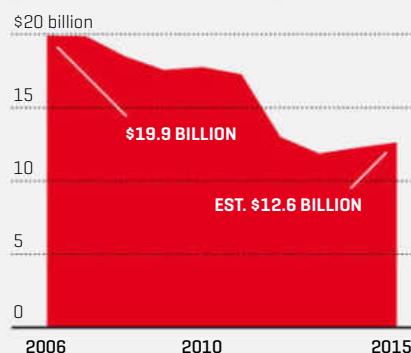
Face-to-face interaction helped Ellison quickly spot disconnects between Penney's executives and its store employees. Early on, he was irked to see senior management in stores wearing designer clothing far beyond the budget of a typical staffer or customer. A snappy dresser himself, Ellison implemented a rule requiring executives to wear J.C. Penney-made clothes when they visit stores and to wear the same name tags store workers do. (During the Frisco store tour, Ellison and the executives all wore Penney brands—Ellison and the other men in Michael Strahan and Stafford suits, a woman colleague in Worthington.)

Can Penney Make More Dollars?

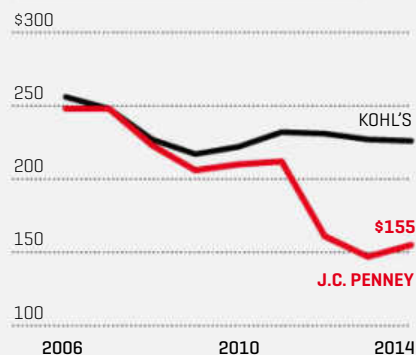
AVERAGE INCOME OF SHOPPERS



J.C. PENNEY TOTAL SALES



SALES PER SQUARE FOOT [ANNUAL]



SOURCES: KANTAR RETAIL; COMPANY FILINGS

Fashion choices weren't the only issue on which management and staff weren't connecting. One legacy of the reinvention fiasco was that inventory management was a mess. Senior management frequently felt that stores were sufficiently stocked, but in-store employees were constantly alerting Ellison to shortages. Management's misreading was exposed on Black Friday weekend in 2014. Penney rang up decent sales but left money on the table, as stores were out of stock of hot items because they had ordered too few. (One hint of the magnitude of lost sales: Penney ordered 330,000 pairs of women's boots for Thanksgiving weekend in 2014 and ran out; in 2015 it ordered 1 million pairs.)

Inventory management is a challenge tailor-

An aerial view of a city harbor at sunset. In the foreground on the left, a portion of a modern skyscraper with a glass facade is visible. The harbor is filled with numerous boats and ships. The city skyline is visible in the background, with mountains in the distance. The sky is a vibrant mix of orange, pink, and purple.

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made for Ellison—part organizational, part technological. His new tech team, which includes several of his former Home Depot lieutenants, has instituted “demand-based logic”: Rather than, say, automatically shipping 1,000 handbags of a given make to every store every month, Penney now replenishes inventory based on real-time sales data. (That may sound like an obvious fix, but, hey, remember the men’s shoes?) Ellison is also refining Penney’s pricing decisions by building databases to better synchronize markdowns and promotions with changes in demand.

Penney’s tech to-do list is lengthy, particularly in e-commerce. All Kohl’s and Macy’s stores offer same-day pickup for online orders, something that Penney is only getting around to this year. And with smartphones fueling 50% of digital traffic, Penney cannot afford to have what Ellison concedes is currently a subpar shopping app. Mike Amend, one of the Home Depot transplants, is hustling to overhaul it. His priorities: integrating coupons and other incentives so that the app can tell shoppers an item’s bottom-line cost. (Amend needs to hurry up—Kohl’s app already does that.) Coming later this year: handheld devices that will let store workers check customers out from anywhere in the store, not just the registers. These devices may look familiar to some shoppers: They’re identical to the ones used at Home Depot.

As Ellison sees it, Penney’s growth will come from getting a lot more sales from its existing customers. Penney says it now has 87 million active shoppers, the same as in 2011. (At its nadir in 2013, Penney had lost 20 million customers.) It posted average annual sales of about \$155 a square foot in 2014—33% below their 2006 peak and well behind those of its competitors (see chart).

To make its stores more productive, Penney can tap a host of enviable retail franchises. Take its 850 hair salons. Few people know it, but the J.C. Penney salon business is the largest such chain in the country; in some markets they’re the dominant salons in town, destinations for prom days and wedding weekends. The salons themselves generate almost 5% of sales. Even more important: Penney says salon customers are among its most reliable shoppers. As Ullman says, “You can’t get a haircut online.” The salonistas come in eight times a year—twice as often as the average department-store customer—and spend twice as much.

Many of the salons, frankly, look tired. But Penney signed a deal last year with *InStyle* magazine to rebrand and upgrade them,



PAST REINVENTORS

Ron Johnson (left) alienated customers with aggressive rebranding; Mike Ullman steadied the ship, but Penney still lost ground to rivals.



with a full rollout due to be completed this year. (*InStyle*, like *Fortune*, is owned by Time Inc.) At the Frisco store the salon has been overhauled already, with slick signage, exposed-brick walls, and a bigger entryway designed to make it more visible and inviting. Penney hopes the rebranded salons will attract top-notch stylists who will, in turn, bring their clients—a new set of customers to woo.

Ellison also plans to better coordinate the salons with Penney’s in-store Sephora cosmetics boutiques—veritable cash machines where annual sales per square foot are almost \$600. Of course, many Sephora shoppers come in, buy lipstick and mascara, and walk right out. Ellison is betting that souped-up salons in proximity to Sephora will offer customers a reason to spend more time at the store and keep them off Amazon.com.

Another prong of Ellison’s strategy: expanding a strong suite of private-label clothing brands. Penney-only names, such as Arizona, St. John’s Bay, and Liz Claiborne, together generate 51% of company sales. Penney is already a player in clothes for “big and tall” men, and it now wants a similar position in plus-size women’s clothing. But it also believes its brands could lure younger shoppers. That’s an existential priority: According to consultant Kantar Retail, the average Penney shopper is nearly 49 years old—up from 46.6 in 2011, and slightly older than the average at Target and Macy’s.

Ken Mangone, who oversees private brands, says Penney recently noticed that its a.n.a clothing brand was unexpectedly popular with younger women. Penney quickly developed Belle + Sky, a similar line intentionally focused on young shoppers, which it just rolled out to 500 stores. Ellison also used Belle + Sky to accomplish another goal: faster turnaround times to compete with “fast fashion” leaders like H&M and Forever 21. Penney squeezed the concept-to-production cycle time to



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25 weeks for Belle + Sky, compared with about 35 weeks on average for its apparel lines.

Penney's in-house brands have one thing in common: They're affordable. According to Kantar, the average household income of a Penney shopper is \$63,412, vs. \$69,000 or so at Target and Kohl's and \$75,274 at Macy's. Memories of watching his parents stretch their budget help Ellison relate to a lower-income customer, he says. He recalls that at one point, to make ends meet, his studious and ambitious father took an extra job as a busboy at a Ramada Inn: "If you saw the guy with a bow tie on, serving drinks, you had no idea who he was if you didn't ask." The blue-collar crowd isn't the market that looks sexiest to investors, but he's adamant that Penney's future hinges on it. "We can convince ourselves that our core customers are a more affluent demographic, but really, they're not," he says.

Marvin Ellison's Recipe for a Renaissance

GET MORE FROM EACH CUSTOMER

J.C. Penney has 87 million active customers, but many spend less there than they used to. Ellison's plan: Manage inventory better so that in-demand products are always in stock, and give customers more reasons to stay in the store.

BUILD ON PRIVATE BRANDS

In-house brands like St. John's Bay and Liz Claiborne account for more than 50% of Penney's sales. The store is building on its clothing lines by adding "big and tall" and plus sizes and shortening production cycles to bring popular styles to stores faster.

SMARTER SHOPPING TECH

Penney is catching up with other retailers by enabling same-day in-store pickup of online orders, improving its website, and overhauling its shopping app to make it easier for in-store customers to find discounts and deals.

AS WE TOUR the handbags section in the Frisco store, an annoyed customer approaches Ellison and his name-tag-wearing co-exec. There's nobody around to ring her up, she complains, and she had the same problem at the holidays. "Why don't the four of y'all get some cashiers," she says. A store manager quickly steps forward to help. But when one underling tells the woman that the store has been busy, Ellison snaps, "Busy' and 'bad' are the same thing to the customer."

In a sense, being "busy" is a sign of a broader contraction. As sales have declined, department stores have closed locations and reduced headcount, compromising service and fueling more customer defections. Industry trends like those fuel skepticism about Penney's future. Retail experts speak of Ellison with admiration, but many see built-in limits to what he can do. "Macy's and J.C. Penney are fighting it out amongst themselves for a dwindling share of the market," says consultant Robin Lewis, CEO of the Robin Report and a former head of Goldman Sachs's retail practice. Kathy Gersch, founder of consultant Kotter International, notes that J.C. Penney is "fixing the major problems," but if it can't become relevant to younger customers, "ultimately there is a ceiling."

The decline of the American mall makes Ellison's job harder.

According to Green Street Advisors, 635 of Penney's 1,020 stores are in malls, and about a third of those are in so-called C- and D-malls—locations with a lot of vacancies, which in turn hurt traffic for the remaining tenants. (Penney has reduced store count by about 80 since 2012, but Ellison has resisted closing more.) Ellison's biggest initiative so far is actually a play on the weakening mall climate. This year, for the first time since 1983, Penney is selling appliances, beginning with a 22-store pilot project. The decision is data driven: The stores realized that a lot of customers were searching for appliances on jcp.com. But it's also a response to the fact that Sears, another mall anchor, is shrinking fast—giving Penney a chance to grab shoppers looking for a fridge.

Observers waiting for a big, splashy move from Penney will have to keep waiting. Penney's debt, which generates about \$400 million a year in interest costs, is a handcuff that impedes any major makeovers. Its capital-spending budget is about

\$300 million a year, a fraction of what Target, Macy's, and Kohl's each spend. While Macy's has been plotting an international expansion, and Kohl's plays around with incorporating virtual reality and robots on the sales floor, Ellison is stuck with prosaic tasks. In February he announced that Penney was looking into selling and leasing back its Plano headquarters to whittle down some of that debt.

Pressed on whether Penney can return to its 2006 apex, when it had \$20 billion in revenue, Ellison punts, saying he's not so concerned with a top-line number as he is with creating a profitable, sustainable business. "We're not going to sit on our hands and play the same cards we played in the past," he says. "We're going to be a modern retailer." But there will be no retail-rock-star pyrotechnics. For now Ellison is playing bass, providing a steady foundation that may, someday, get Penney back in the groove. **F**

COMPANY SPOTLIGHT | **SERVICEMASTER**

On the Move: Driving Growth With Service and Technology



“The services we provide are all things that people need regardless of what’s happening in the economy, which is what has made us so resilient over time. We want to drive growth by providing a superior service in a high-quality way that’s easily accessible. I’m excited about our future.”

ROBERT GILLETTE
CEO

After 87 years of providing essential services to homes and businesses, this American mainstay is going mobile in more ways than one.

FOR A MULTIBILLION-DOLLAR company with seven major brands, the arrival of a new semitrailer is usually not a big deal. But the 75-foot custom-built tractor-trailer that ServiceMaster unveiled in January is poised to get the conversation rolling—literally and figuratively—about where the company is headed.

The 1,000-square-foot interactive “mobile experience” will make more than 70 stops this year as it travels to college campuses, trade shows, and other events to make people more aware of the essential services ServiceMaster provides to homes and businesses through its well-known brands: American Home Shield, AmeriSpec, Furniture Medic, Merry Maids, ServiceMaster Clean, ServiceMaster Restore, and Terminix.

“It’s surprising for a lot of people to find out all the different services we provide,” says the man steering the company, CEO Robert Gillette. “People know us only by a specific product or brand and aren’t aware of the many other services we offer. We have more than 5 million customers, but fewer than 10% are shared by any of the other brands, meaning we don’t perform more than one service to 90% of our customers. That’s opportunity.”

Each day the company provides 75,000 homes and businesses with services such

as appliance repair and restoring homes and businesses affected by fire, water, and disasters. While the basics of those services haven’t changed dramatically since the company was founded in 1929, today’s customers interact differently. So to further leverage its brands, ServiceMaster is going mobile in other ways, too.

“Part of what we can do with mobile technology is to give our customers access to us in different ways, so we’re implementing technologies that make it easier for our people in the field to service the customer and for our customers to communicate with us,” says Gillette. “We still do the same things, but we want to make it really easy for people to find us, buy from us, and stay with us.”

It’s already working: A growing portion of ServiceMaster’s business originates from its consumer websites. “The services we provide are all things that people need regardless of what’s happening in the economy, which is what has made us so resilient over time,” adds Gillette. “We want to drive growth by providing a superior service in a high-quality way that’s easily accessible. I’m excited about our future.”

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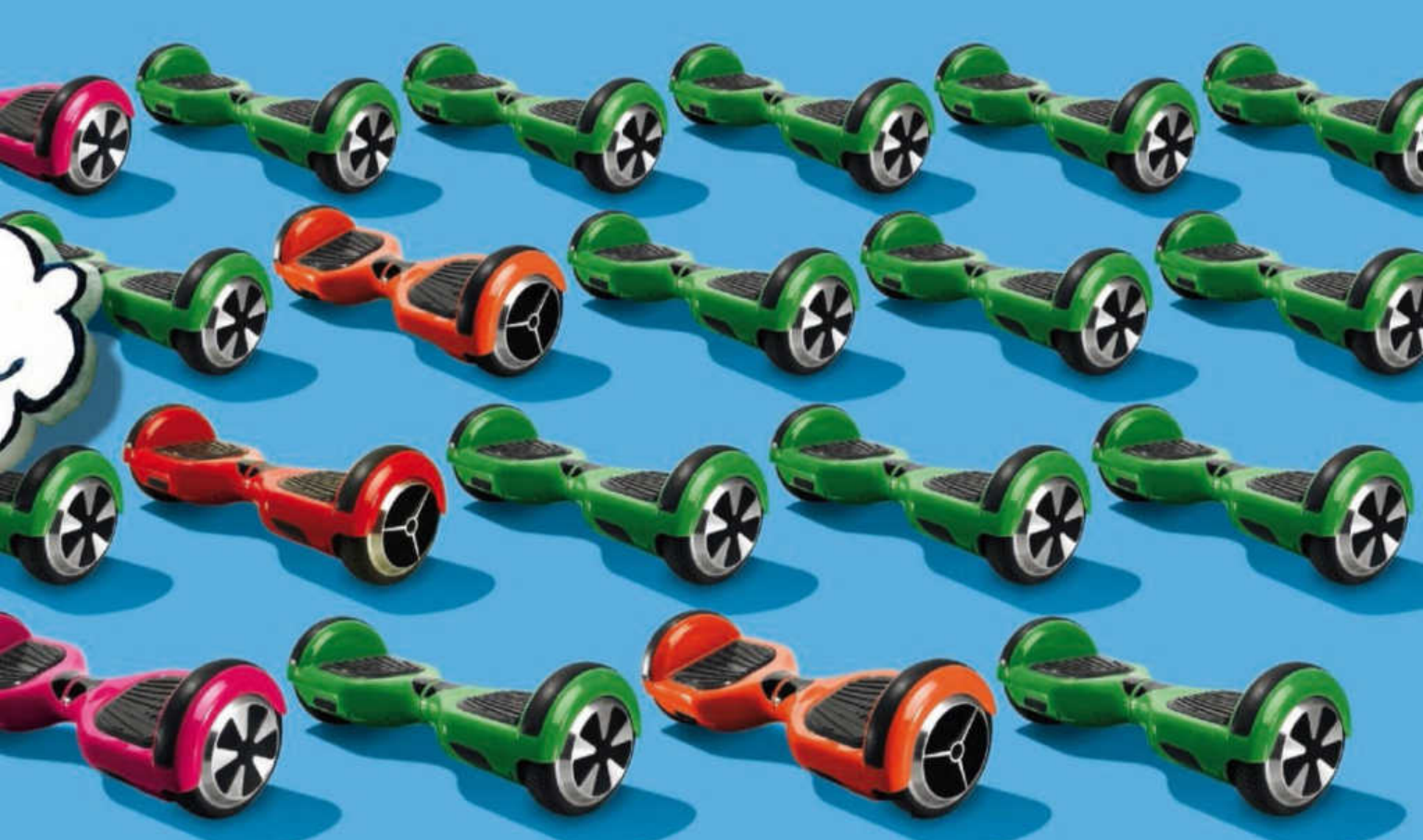
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GOES THE



HOVERBOARD FAD

CHINESE FACTORIES CREATED THE HOVERBOARD INDUSTRY
PRACTICALLY OVERNIGHT—**THEN CAUSED IT TO GO UP IN SMOKE.**
THE RISE AND FALL (AND POSSIBLE REBOUND) OF A TECH FAD OPENS A WINDOW
ONTO THE ERRATIC, TRILLION-DOLLAR WORLD OF COPYCAT MANUFACTURING.



BY SCOTT
CENDROWSKI

Ten days before Christmas, Jerry Feng got the bad news. ¶ His company, Shenzhen Bojulong Display Technology, was wrapping up a terrific 2015. His factory was one of hundreds in China cranking out no-name versions of the two-wheeled devices Western culture has adopted as “hoverboards.” Shenzhen Bojulong produced as many as 2,000 a day, selling them to distributors who resold them online to thrill seekers from Australia to America.

But then Amazon abruptly pulled most hoverboards from its sites, worldwide, because of safety concerns. By then the battery-driven gadgets had shown a distressing tendency to burst into flames, occasionally burning down owners’ homes in the process. And it wasn’t just Amazon applying pressure: Around the same time, Razor, an American company best known for its two-wheeled scooter, bought licensing rights from the hoverboard’s U.S. patent holder and began cracking down on copycats by suing a big American reseller.

It all spelled trouble for Feng’s factory and its competitors. His company hadn’t licensed any patent—its boards were copycats. Even if it could prove that its boards were safe (Feng says none of his models were implicated in fires or explosions), it could face legal sanctions. Today Shenzhen Bojulong has just 100 employees, having laid off 400 since the double whammy of bad news. Around Shenzhen, since mid-December a cottage industry of more than 1,000 factories that were churning out the boards has shrunk to a couple hundred. “We maybe lost 50% of our revenues after the Amazon announcement,” says Feng, speaking from his shamrock-green factory floor.

Despite its dangerous rep, the hoverboard is as ubiquitous in American culture right now as the Big Wheel once was. It doesn’t actually hover, of course. It’s more

like a Segway minus the pole and handlebars, a platform that riders steer with subtle shifts in weight. A well-coordinated hipster can learn to ride one in a couple of minutes. Hoverboards started catching on in the U.S. last May, after Jamie Foxx wheeled one onto *The Tonight Show*’s set. Initially expensive and hard to buy, they looked every bit the Brookstone oddity. But then Justin Bieber, rapper Wiz Khalifa, and other celebrities released Vines and Instagrams of their hoverboard exploits, fueling a wave of buying that spread from the celeb-obsessed to the gadget-savvy to the average teen. Brands like PhunkeeDuck (Foxx’s choice) popped up on Amazon, while other direct-from-China websites sold \$300 unbranded versions. By the end of 2015, 40,000 boards were coming into the U.S. each day. While nobody tracks total sales, manufacturers have shipped more than \$2 billion worth of hoverboards over the past year and a half, by *Fortune*’s estimates.

The fad would have never reached such proportions without companies like Shenzhen Bojulong. China is home to more than 250,000 small manufacturers like Feng’s, according to the country’s National Bureau of Statistics, accounting for about \$1.3 trillion in annual output. The nimble operations can switch production lines on a dime, supplying customers worldwide with selfie sticks, pedometers, LCD TVs, and whatever else is trending. And if not all the production is of the highest quality, well, do you really need the best flat-screen TV on your block when a cheaper one will do?

When knockoff manufacturing goes wrong, however, everybody gets egg on his face. Copycats turned hoverboards into one of the fastest global boom-to-bust cycles in modern business. The first reports of boards’ combusting because of shoddy lithium-ion batteries hit social media late last fall. Since Dec. 1, the U.S. Consumer Product Safety Commission has opened investigations into 39 hoverboard fires in 19 states; there have been fires in Europe and Australia too. After Amazon pulled most boards from its site before the holidays, other retailers followed suit—though only after many shoppers had already put one under the tree. All the major airlines have banned hoverboards from flights. Patent-infringement lawsuits among the pop-up brands selling them, meanwhile,



HOW A FAD CAUGHT FIRE

Highlights and lowlights of the hoverboard’s boom-to-bust cycle.

2014

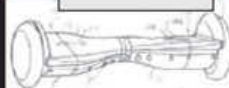


Feb. 25, 2014

Shane Chen publishes a YouTube video of his Hovertrax device as part of a Kickstarter solicitation.

May 27, 2014

Chen’s U.S. patent for a hoverboard is approved.



August 2014

Chic starts selling hoverboards in China.

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have just added to the reputational smog surrounding the product.

And yet, remarkably, hoverboards remain international bestsellers. Elsewhere in China, slightly higher on the manufacturing food chain than Feng, another company is still building them and even plans to shift production onto American soil this year. It's got reason to be optimistic: It created the hoverboard hype, after all.

THE OFFICES OF Hangzhou Chic Intelligent Technology, a.k.a. Chic Robotics, are 40 minutes outside downtown Hangzhou, some 800 miles from Feng's factory, in a yellow, pastel-painted office park coated with construction dust. It's a division of Innoworks, a partly state-owned company that matches academics with businesses to help China meet its goal of accumulating patents. Last year Chic recorded about \$30 million in sales—80% of it from hoverboards.

Until recently Chic was best known for turning out imitation Segways. But its toy of choice changed, thanks in part to a 34-year-old American named John Soibatian. Soibatian, a former scout for startups for Verizon, had been in talks with Chic about exporting other products to the U.S. But on a 2014 trip to Hangzhou, he saw Chic's hoverboard prototype for the first time. He recognized something special, a toy fusing Silicon Valley geekery with skateboarder cool. He told Chic CEO Ying Jiawei that he thought the new invention could sell well—very well—in America. "My idea was to have this as the hottest-selling item of 2015," Soibatian says.

Chic moved fast, submitting design patents in China, Europe, and the U.S. and unveiling its hoverboard to thousands of potential customers at China's biggest trade expo, the Canton Fair. Rapturous responses followed, and Chic set aside factory space to build boards especially for Soibatian's U.S.-based company, IO Hawk, which sold them for up to \$1,800 each. Chic also started making boards that it sold for less under its own brand, S1.

Fall 2014
Chic displays its S1 board at the Canton Fair for 180,000 potential buyers. By year-end, 1 million hoverboards are sold worldwide.

January 2015
CES, Las Vegas: Both IO Hawk (made by Chic) and Hovertrax (made by Chen) attend.

May 20, 2015
Jamie Foxx rides a Phunkee-Duck onto the set of *The Tonight Show*.

June 2015
Chen's company sues IO Hawk for patent infringement.

Sept. 8, 2015
Chic Robotics' U.S. patent is approved.

Oct. 1, 2015
A group of dancers score a viral hit with a dance routine set to **Justin Bieber's** "What Do You Mean?" and performed mostly on hoverboards.

October–November 2015
About 40,000 hoverboards a day, 1.2 million a month, are shipped into the U.S. from China.

Demand quickly grew in China (where hoverboards are known as *pinghengche*, or "balancing wheels") and abroad, and Chic couldn't produce enough. It soon licensed its design to 30 other Chinese factories. The factories agreed to build boards according to Chic's safety and quality standards; in return they got detailed blueprints.

The expansion plan, however, poured fuel on an already raging copycat fire. Unlicensed manufacturers had begun copying Chic's board immediately after it appeared in Canton. By the summer of 2015, more than a thousand factories—up to 10,000, by some estimates—were making boards for distributors who sold them abroad online. Factories like Feng's that had been making LED screens or iPhone cases switched to building hoverboards in a matter of days. And many factories, licensed and otherwise, cut corners on safety standards, often by subbing in cheaper, potentially flammable batteries. "We have licensed to 30 factories, but only a few follow our rules," Ying laments.

By late last year Chic had filed some 100 lawsuits against copycats in China. But the damage was done: Chic's efforts to prop up the industry had emboldened the very factories that were ripping it off.

SHANE CHEN ARGUES that it wasn't Chic's board to begin with.

Chen grew up in China and moved to the U.S. at 30; he's now a serial inventor who lives and works outside Portland, Ore. He's the creator of a vegetable strainer that has sold on QVC, a single-person water-levitating hydrofoil, and a gyroscope-powered unicycle without a seat called the Solowheel. Chen also invented a hoverboard, one he patented in the U.S. in 2014 and started selling under the brand name Hovertrax.

The Solowheel sold modestly in the U.S., but it appeared everywhere in China after dozens of companies copied Chen's idea. Chen filed several lawsuits and learned a lesson about legal reality in the country. After he sued a company that had government ties, the judge in the case advised Chen over the phone to settle. "Even if you win the case, they will set up new a business and come back," Chen says the judge told him. "You never can enforce the law, even if you win." (Chen eventually took a settlement.)

Chen relayed this story to Chic's CEO Ying in person last September, when he visited

2015

>>>



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At the 2015 *Fortune* Most Powerful Women Summit, two rising-star women from developing countries were honored with the annual Goldman Sachs – *Fortune* Global Women Leaders Award. Gary Cohn, president and COO of Goldman Sachs, helped to honor these business owners, who effectively apply back home the lessons learned through mentoring programs, and as a result, represent the multiplier effect of investing in women.

Tidings Chimphondah of Zimbabwe, a participant in the *Fortune*/U.S. State Department Global Women's Mentoring Partnership, is managing director of Progroup Holdings. She formed Pronourish, a company producing corn soya blend (CSB) for food aid during the country's economic crisis. In 2009, her CSB factory expanded to include a stock feed manufacturing plant, Profeeds; these two companies now employ more than 700 people. Tidings has since

used her mentoring experience to start Moms Are Geniuses, an economic empowerment platform she oversees while still running Progroup Holdings.

Hanan Khalil of Egypt, an alumna of the Goldman Sachs *10,000 Women* Initiative, is the founder of Al-Zahraa Trade, a Cairo-based company that imports and sells pharmaceutical ingredients. She joined *10,000 Women* to develop better human resources practices and to strengthen her ability to manage her company's finances. Since graduating from the program, Hanan has more than doubled the company's revenue. In 2014, she founded a second business, Fadomo Designs, which sells handcrafted products. She aspires to mentor underprivileged women, who can then provide job opportunities that improve their communities.

► To learn more about this program, visit:
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Hangzhou. By then, Chen had already sued Chic's partner, IO Hawk, in the U.S. for patent infringement. Chen thinks that Chic's designers watched a video Chen had made for a Kickstarter campaign for the Hovertrax and copied his concept. "That's my guess," he says. "They've been knocking off Segways for many years."

Still, Chen went to China ready to make a deal. He says Chic offered to buy his patent as a backup to its own and promised to pay Chen 5% royalties. "We were laughing" about the copycat epidemic, Chen says, adding that Chic executives "felt very angry that everyone copied their [design], not mine." But Chen says Chic asked for too much (he doesn't elaborate), and talks broke down.

Soibatian of IO Hawk says Chen's patent isn't enforceable. He may be right: The patent is light on specifics about the interior functions of the hoverboard, says Benjamin Bai, an intellectual-property lawyer and a partner at Allen Overy in Shanghai who reviewed the patent for *Fortune*. If the patent is too narrowly constructed, whether Chic borrowed Chen's idea may be a moot point. (The suit is set to go to trial in April 2017.)

Chic, which isn't named in Chen's suit, says it has been developing a hoverboard since at least 2012. In his Hangzhou office, Ying brandishes originals of Chic's patents in China, the U.S., Canada, Japan, Britain, Russia, and the European Union. "His project is very similar to Segway's," Ying says of Chen. "That's why Segway has a lawsuit against *Shane Chen*." (Indeed, the Chinese company Ninebot, which now owns the Segway brand, has released its own hoverboard, and it sued Chen's company last fall. Chen replies, "Our lawyers don't think we infringe any of the Segway patents.")

Chic is one of the few hoverboard players not currently tangled in a U.S. lawsuit. But it's keeping an eye on Shane Chen's new ally, Razor. In November, Razor bought exclusive rights to use Chen's patent for its hoverboards; almost immediately Razor sued

2016

November 2015

Razor buys the exclusive license to produce Chen's hoverboards. It sues U.S. brand Swagway for patent infringement.

Nov. 21, 2015

A Fit Turbo hoverboard explodes in Louisiana, in the first such incident reported in the U.S.

Dec. 14, 2015

Amazon bans the sale of devices from Swagway and other hoverboard makers, citing safety issues.

January 2016

Hundreds of factories close their hoverboard production lines in China.

**Jan. 20, 2016**

The Consumer Product Safety Commission says it is investigating 39 hoverboard-related fires in 19 states.

[Shown above: The results of a hoverboard fire in Chappaqua, N.Y.]

**Jan. 27, 2016**

The New York Metropolitan Transit Authority bans the possession of hoverboards on New York City subways.

Swagway, one of the bigger U.S. importers of Chinese boards. Razor has claimed victories in past patent battles, having won injunctions and restraining orders against American companies importing Chinese copies of its eponymous scooter. "Razor intends to enforce its patent rights and seek to stop the flood of knockoffs," a company spokesperson says. (Swagway says it doesn't believe that Chen's patent is valid.)

SINCE DECEMBER, U.S. Customs officers in Los Angeles and elsewhere have been seizing incoming Chinese hoverboards, citing both safety and intellectual-property issues. For Chic's Ying, that's vindication for his side in the copycat wars. None of Chic's boards, or Chen's, have been linked to fires. Amazon still isn't selling Chic's hoverboards—Ying says Amazon's lawyers haven't told him why, and the company declined to comment to *Fortune*. But Chic's own boards and IO Hawk's are getting through customs, Ying says, because they have safety certifications and patents. The boards sell at kiosks in American malls and via websites other than Amazon—outlets where sales have kept humming even as bigger retailers scale back.

Next up for Chic this year: U.S. expansion, though its plans still sound embryonic. "What do you think of the brand name 'Chic' in America?" Chic's overseas director, Simon Wang, asks a reporter. "Not very good, right? Maybe something else? 'Powered by Chic?'" Chic is searching for factory facilities in Houston or Denver, where former General Motors plants offer attractive leases. A legal showdown with Chen and Razor may loom, but for now Chic appears unconcerned. "For office locations, what's better, the West Coast or East Coast?" Wang asks.

For Feng, the manufacturer in Shenzhen, Razor's entrance into the fray was one headache too many. "It is hard to export to the U.S. now," he says. The fact that Chic's boards are getting through U.S. Customs is ironic: If Feng's company had licensed designs from Chic before controversy erupted—something that would have cost just 10,000 renminbi (\$1,500) in royalties, and was encouraged by the local Shenzhen government—it could be selling hoverboards today.

Instead, Feng has abandoned the fad to chase a more reliable opportunity. Shenzhen Bojulong is now a licensed contract manufacturer of an American company's drones. **PHOTO**

ENERGIZING DISRUPTION

RECOGNIZING ACHIEVEMENT AND INNOVATION IN OIL, GAS, ELECTRICITY, AND ALTERNATIVE ENERGY.

REFLECTING THE international interdependence of energy markets, energy executives from 15 countries came together to celebrate innovation in the oil, gas, electricity, and alternative energy sectors at the 17th annual Platts Global Energy Awards gala in New York City last December.

Event host Platts, the leading independent provider of information and benchmark prices for the commodities and energy markets, honored companies and individuals advancing the energy industry with new technologies.

"The Platts Global Energy

Awards honor organizations and individuals who are dedicated to achieving excellence. Given the key role the energy industry plays in the global economy and its impact on society, we believe that those who are committed to addressing the industry's most pressing issues and uncovering its greatest opportunities deserve high praise for their positive contributions," says Imogen Dillon Hatcher, president of Platts.

Madrid-based Repsol received awards for Energy Company of the Year and Industry Leader Downstream, reflecting its leadership in the oil refining sector, where it has seen its

margins increase after major plant upgrades; Repsol's general director of downstream, Maria Victoria Zingoni, took home the Rising Star Individual Award. Repsol's commendations followed its acquisition of Talisman Energy last May, which lifted the company higher in the ranks of global integrated energy companies and solidified its emphasis on natural gas as a bridge fuel for future expansion in the transportation and electricity sectors.

"Diversification and efficiency are where we think you've got to be," says Kristian Rix, Repsol's deputy director of international communication, regarding the company's commitment to ex-

panding as an integrated one.

Other award winners included CEO of the Year Nishi Vasudeva, chairman and managing director of Hindustan Petroleum Corporation Ltd., the first Indian woman to run a *Fortune* Global 500-ranked company; Lifetime Achievement honoree Terry Boston, retired president and CEO Emeritus of PJM Interconnection; and REstore, which took home the Grid Edge Award for Energy Management.

For all winners, visit www.GlobalEnergyAwards.com.



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THE *FORTUNE* ENTREPRENEURS



In honor of **Venture**, an all-new section on Fortune.com, we present 15 disrupters who are impacting their industries in novel ways. Executives of Fortune 500 companies, we advise you: **Pay attention.**



By Jonathan Chew, Erin Griffith, Robert Hackett, Beth Kowitt, Michal Lev-Ram, Laura Lorenzetti, Polina Marinova, Dan Primack, and Leena Rao



SCOOTER BRAUN

Founder,
SB PROJECTS

Weeks before Justin Bieber will release his new album, *Purpose*, the tracking numbers suggest a dogfight for No. 1 on the charts. Scooter Braun, Bieber's manager since discovering the pop star on YouTube in 2008, can't let the comeback fall flat. He calls an impromptu meeting in Los Angeles, where he suggests a series of "fan experience" events—part concert, part confessional—that would bundle tickets with album sales. Braun quickly books the Staples Center, Bieber announces the event via social media, and *Purpose* goes on to have the ➔

best first-week sales of any album in more than a year. It was the latest masterstroke from Braun, a 34-year-old college dropout who has upended the music industry by placing artists (and their managers) on equal footing with record labels. The artist roster for Braun's SB Projects reads like a who's who of the Hot 100: Black Eyed Peas, Tori Kelly, Karlie Kloss, the Wanted. It has also expanded into television and movie projects, such as the CBS program *Scorpion* and a Bieber concert film. But not sports—Braun's too big a fan. "For me it's still pure," he says, adding that he's been approached by athletes seeking representation. "I'm like Spike Lee, sitting courtside. No amount of money is worth taking that away." And then there is Ithaca, which reports have described as a \$120 million investment fund through which SB Projects has backed tech startups like Spotify and Uber. *Fortune* has learned that the entity is about much more than venture capital: Ithaca also acts as a holding company for SB Projects and previously unreported ownership interests in seven of the nation's largest music management companies. The structure allows Braun's influence (and earnings) to be much stronger than previously known. Braun says his business hustle is inspired by his great-grandfather Irving Slavin, a Russian immigrant who moved to the Catskills with a few dollars in his pocket to start a real estate business. "He used to read *Fortune* every month," Braun says. "He worked hard and lived out his dream. If his great-grandson can be in *Fortune* for being an entrepreneur, well, that's pretty cool." —Dan Primack

Streaming music services are blamed for ruining the record industry. Why, then, did you invest in Spotify? When you fight technology, you lose. You have to adapt.



SILICON VALLEY CLAIMS
40%
OF VENTURE CAPITAL DEALS IN U.S.

33%
OF NEW ENTREPRENEURS ARE COLLEGE GRADUATES



LAURA WEIDMAN POWERS
CEO

TRISTAN WALKER
Chairman, CODE2040

students inside large technology companies (recent partnerships: Apple, Google). The co-founders seek true diversity in the tech industry. Says Walker, 31: "These are the folks who will inspire more people to participate in Silicon Valley." —Jonathan Chew

How do you view Code2040 in light of the wider conversation on race?
Weidman Powers: My generation was raised on the idea of being color-blind. Now if you are color-blind, you are not seeing me.



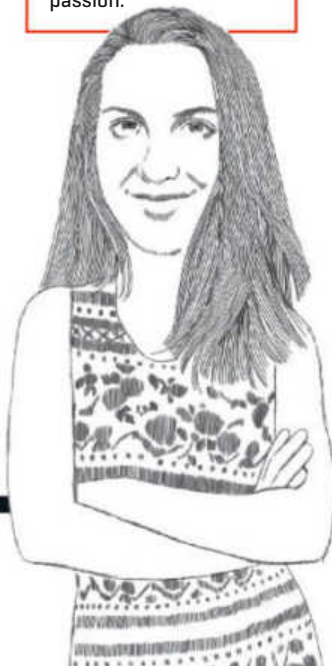
ANYA POGHARIAN

Inventor, DIALYSAVE

Anya Pogharian's \$500 dialysis machine has captured the attention of Bill Clinton and the Cleveland Clinic. Pogharian, 18, was shocked at the \$30,000 cost of conventional dialysis machines—a price she felt was far too high for a lifesaving treatment. Pogharian's prototype is able to filter four liters of blood in 25 minutes, much faster than the usual four hours. She's working on a third prototype and a business framework for her invention, all while preparing for her first year of college.

—Laura Lorenzetti

What are the next steps for your portable dialysis machine? I'm really focused on the science of it and getting that to the point of perfection. But I also need to build a good team of scientists and business partners. Right now I'm managing it all on my own. Balancing it all is practically impossible, but it's my passion.



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ENTREPRENEURS
ACCOUNT FOR
28.5%
OF ALL NEW
ENTREPRENEURS
IN THE U.S.

\$362
BILLION:
PRIVATE
INVESTMENT
IN
STARTUPS
IN THE PAST
FIVE YEARS

SOURCE: KAUFFMAN.ORG



SOLO

FOUNDERS'

SEED

VALUATIONS

WERE

25%

LESS THAN

TEAMS

WITH MORE

THAN ONE

FOUNDER

PHOTOGRAPHS BY BENJAMIN RASMUSSEN



STEWART BUTTERFIELD

CEO, SLACK

PLENTY OF STARTUP "unicorns" hit speed bumps in 2015, but Slack stepped on the gas. The business-communication software maker last year raised its valuation to \$2.8 billion, boosted its headcount to 350, and added 470,000 paid users. It even formed an \$80 million investment fund to back companies building software for its platform. Developers submitted so many apps that Slack's review process broke down. Says Butterfield, 42: "That's really encouraging." —Erin Griffith

What's the best negative advice you've gotten?

Do not let people who should be fired stay at the company for too long. It's not great for them, but it's really destructive for the people who work with them. If you can't find another role for a person and you keep them around because you're nice, you put off the bad feeling you get from being mean—but it's worse for everyone in the end.



LAURA RICCIARDI

MOIRA DEMOS *Directors,*
MAKING A MURDERER

Filmmakers Moira Demos (below right) and Laura Ricciardi touched a nerve when their wildly popular TV miniseries, *Making a Murderer*, was released on Netflix in December. The duo spent a decade following Steven Avery, a Wisconsin man wrongly sentenced to 18 years in prison (and now serving time for another gruesome crime). They pitched the documentary to HBO and eventually sold the rights to Netflix. Since then, hundreds of thousands of people have petitioned for Avery's release. —Michal Lev-Ram

What was your go-to place to eat while you were filming in Manitowish County, Wis.? It was really difficult—we were both pescatarian. There was an authentic Thai restaurant on Eighth Street. You had to order your dish mild. "Spicy" was incapacitating.

9.4
MILLION
BUSINESSES
OWNED BY
WOMEN IN
THE U.S.

"GET
OUT OF
YOUR
GARAGE
AND GO
TAKE
A CHANCE
AND
START
YOUR
BUSINESS."

KEVIN PLANK,
FOUNDER,
UNDER ARMOUR




MICHAEL MENTE MIKE KARANIKOLAS

Co-CEOs, REVOLVE

Since it was founded in 2003, online apparel retailer Revolve has grown slowly, deliberately, and profitably. Last year the Los Angeles company sold \$440 million worth of 1970s-style bohemian dresses, low-cut bodysuits, and stacked-heel sandals. If you've never heard of Revolve, that's by design. Co-founders Michael Mente, 35 (above left), and Mike Karanikolas, 37, known to their 400 employees as "the Mikes," haven't chased tech-blog hype or venture-capital-fueled growth. The strategy has worked. As buzzy, well-funded competitors like Nasty Gal and Gilt Groupe endure layoffs and change hands for a fraction of their soaring valuations, Revolve beats expectations. It topped its 2015 revenue projection by 10% and expects to grow 40% to 50% next year. "We're trying to build a business for the long term," Mente says, "a business that we want to own forever." The Mikes hope Revolve becomes a billion-dollar company. Not in value, mind you—but \$1 billion in sales. —Erin Griffith

It's been a rough ride for e-commerce lately. What does it mean for you?

Mente: When some of these startups emerged from nowhere and there was a lot of hype, we watched and thought, Is there something there? We thought we were the ones missing something. But it's important to stay focused. It validates the old-school approach of growing the business from the ground up, taking the opportunities that are there, and getting to \$1 billion in sales at the appropriate pace.



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BLYTHE MASTERS

CEO, DIGITAL
ASSET HOLDINGS

BLYTHE MASTERS IS no longer just one of the most powerful women on Wall Street—she's one of the most powerful women on the block too. That's "block" as in "block chain," the distributed ledger technology that powers digital currencies like Bitcoin. The former J.P. Morgan executive who (for better or worse) helped pioneer the creation of credit default swaps in the 1990s has returned with a new venture, Digital Asset Holdings, that is exploring how to apply the cryptocurrency-friendly protocol to other parts of the financial services industry. Masters, 46, says the block chain could eliminate billions of dollars' worth of redundancy, latency, and error costs in the post-trade processing of assets like bonds and equities. That aspiration has attracted no shortage of attention in the banking world: The company has raised more than \$60 million from 15 of the world's biggest financial and tech firms and has begun a trial program with her former employer.

—Robert Hackett

Explain the block chain in layman's terms. If ever a topic needed demystifying, this is it. The technology is simply a newer, better, more sophisticated form of database technology.



"LISTEN MORE THAN YOU TALK."

—RICHARD BRANSON, FOUNDER, VIRGIN GROUP



**NICOLAS
JAMMET**

**JONATHAN
NEMAN**

NATHANIEL RU
Co-CEOs
SWEETGREEN

Ru, 30;
Jammet, 30;
Neman, 31
[from left]

If legacy restaurant companies could start from scratch, most of them would want to look like Sweetgreen. The high-end salad chain, backed by big-name investors like Steve Case, Danny Meyer, and Daniel Boulud, hits all the right notes in today's food industry—healthy, fresh, organic, and local. The recipe has resonated with diners, who keep lines long at Sweetgreen's 40 locations. But traditional chains could learn about more than just food from the company's co-CEOs. The Georgetown University classmates have been tech pioneers, and 30% of Sweetgreen transactions are made through its website or mobile app. The trio are also rethinking management strategies. To stay close to customers, Sweetgreen almost completely shuts down the corporate offices five times per year so that everyone can work in its restaurants. —Beth Kowitt

What advice would you give your 20-year-old self? Ru: I'd tell myself to read more books—even more than you think you have time for.

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HONDA



**JOSH BRUNO**

CEO, HOMETEAM

Twenty-nine-year-old Josh Bruno quit his job at Bain Capital Ventures, turned down a Harvard Business School offer, and founded Hometeam. With \$38.5 million in venture capital, the two-year-old New York City company aims to rethink how in-home care is administered to senior citizens. Bruno rejects the popular independent-contractor model and instead employs caregivers as W-2 workers with health benefits, 401(k) plans, and a career progression path. The startup pays 30% to 50% more than the hourly industry standard and uses software to match caregivers with seniors.

—Polina Marinova

Could Hometeam be a billion-dollar company? If we received a \$1 billion offer to sell tomorrow, I absolutely would not take it. That's not what drives me. We're not done yet.

**1 IN 5**

STARTUPS

SEEKING

VENTURE

CAPITAL

HAS A

FEMALE

CO-

FOUNDER

41%OF FIRST-TIME
ENTREPRENEURS
ARE NON-
WHITEFEEDBACK letters@fortune.com**PIRAYE YURTTAS BEIM**

CEO, CELMATIX

DATA ANALYTICS is changing how companies make business decisions. Piraye Yurttas Beim believes that it could change personal decisions too—like whether to have a baby. Beim's startup Celmatix makes software called Polaris that crunches medical data from millions of women to accurately predict which treatments, from in-vitro fertilization to freezing one's eggs, will result in pregnancy. Nearly 7 million American women have trouble conceiving a baby, resulting in a \$9 billion fertility industry. More than 12 fertility clinics in the U.S. are using Celmatix software to help tens of thousands of patients become pregnant. Next up for Beim? Developing the first-ever genetic test that will predict infertility. —Leena Rao

What's the best advice you've received as an entrepreneur?

Make every week count, as my board member Cory Ondrejka says. If you can't explain every week how you have materially moved the business forward, you won't succeed as a startup.



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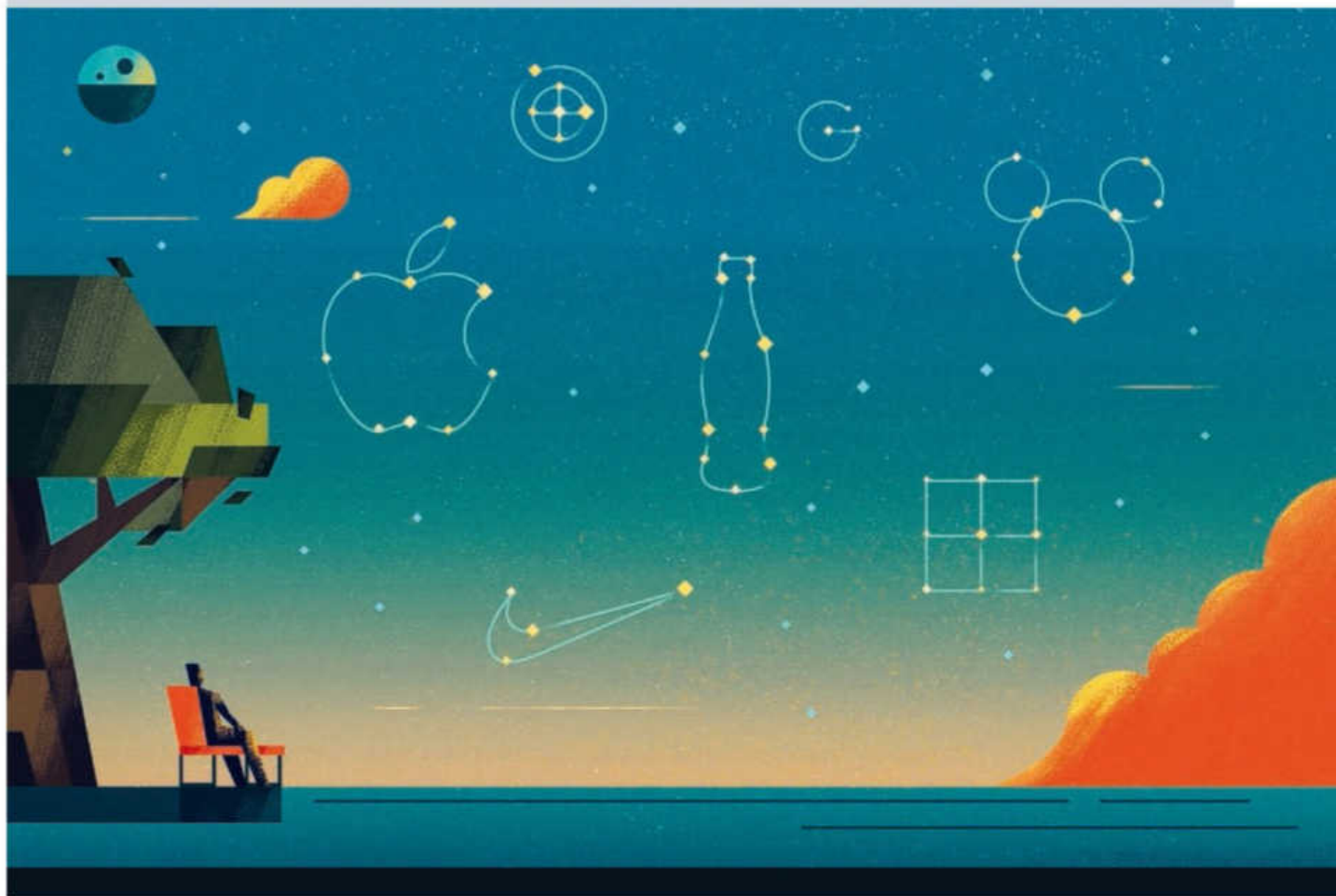
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COMPANIES 2016

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THE RESULTS ARE IN! WE ASKED THOUSANDS OF INSIDERS, DIRECTORS, EXECUTIVES, AND ANALYSTS TO PICK THE MOST RESPECTED NAMES IN GLOBAL BUSINESS. HERE'S WHO THEY CHOSE.



THERE'S A NEW AAA STANDARD IN CORPORATE AMERICA: the one-two-three punch of Apple, Alphabet, and Amazon. For the fourth time, our list of the World's Most Admired Companies Top 50 All-Stars is led by a trio of tech giants under 40 years old. They preside over a class of blue chips and even younger tech stalwarts, such as Facebook [No. 14], Salesforce [No. 34], and Netflix, which makes an impressive return to the list at No. 19. Other returnees to the top 50 include St. Jude Medical [No. 40], Deere [No. 46], and Charles Schwab [No. 50], which join newcomers Visa and Publix, debuting at Nos. 47 and 49. For much more on the World's Most Admired Companies, visit fortune.com/WMAC. —Christopher Tkaczyk

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The World's Most Admired Companies don't just embrace change, they instigate it. So do we. As the world's largest consulting firm, we seek to improve outcomes, bring bold ideas to market and help clients excel. It's how the best companies move forward, transforming the world around them as they go.

[Open here to see 2016's Most Admired list.](#)

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Consulting

THE 50 ALL-STARS

1	Apple	[2014 rank: 1]	26	BlackRock	[31]
2	Alphabet ¹	[2]	27	CVS Health	[45]
3	Amazon.com	[4]	28	Toyota Motor	[24]
4	Berkshire Hathaway	[3]	29	Marriott International	[37]
5	Walt Disney	[6]	30	Delta Air Lines	[39]
6	Starbucks	[5]	31	Home Depot	[41*]
7	Southwest Airlines	[7]	32	IBM	[25]
8	FedEx	[12]	33	UPS	[34]
9	Nike	[13]	34	Salesforce.com	[50]
10	General Electric	[9]	35	Samsung Electronics	[30]
11	American Express	[8]	36	Accenture	[49]
12	Costco Wholesale	[16]	37	Exxon Mobil	[32]
13	Nordstrom	[14]	38	Nestlé	[33]
14	Facebook	[26]	39	Target	[48]
15*	Coca-Cola	[10]	40	St. Jude Medical	[—]
15*	Johnson & Johnson	[11]	41	Unilever	[36]
17	Microsoft	[20]	42	Walmart Stores	[38]
18	BMW	[15]	43	Intel	[40]
19	Netflix	[—]	44	PepsiCo	[41*]
20	J.P. Morgan Chase	[35]	45	Caterpillar	[28*]
21	Procter & Gamble	[17]	46	Deere	[—]
22	Boeing	[27]	47	Visa	[—]
23	Goldman Sachs Group	[23]	48	AT&T	[47]
24	Whole Foods Market	[18]	49	Publix Super Markets	[—]
25	Wells Fargo	[22]	50	Charles Schwab	[—]

THE 50 ALL-STARS BY CATEGORY

COMPUTERS AND COMMUNICATION
CONSUMER PRODUCTS
CONTRACTED SERVICES
FINANCIALS
MEDIA AND ENTERTAINMENT
NATURAL RESOURCES
POWER
PRECISION
SHELTER
STORES AND DISTRIBUTORS
TRANSPORT



DROPPED OUT OF THIS YEAR'S TOP 50: 3M, CHIPOTLE MEXICAN GRILL, MCDONALD'S, SINGAPORE AIRLINES, USAA, AND VOLKSWAGEN

INDUSTRY STANDOUTS

THE MOST



COMPUTERS AND COMMUNICATION

CABLE AND SATELLITE PROVIDERS

1. Comcast [1]
2. Liberty Global [2]
3. Time Warner Cable [5]

COMPUTER SOFTWARE

1. Adobe Systems [3]
2. Microsoft [4]
3. Salesforce.com [1]
4. Intuit [2]
5. Autodesk [6]
6. Electronic Arts [8]

COMPUTERS

1. Apple [1]
2. EMC [2]
3. Lenovo Group [4]
4. Asustek Computer [6]
5. Seagate Technology [5]
6. Western Digital [8]
7. HP² [10]
8. Canon [7]

INFORMATION TECHNOLOGY SERVICES

1. Accenture [1]
2. IBM [2]
3. Booz Allen Hamilton Holding [3]
4. Fujitsu [3³]
5. Cognizant Technology Solutions [4]
6. Gartner [—]
7. CACI International [6]

INTERNET SERVICES AND RETAILING

1. Alphabet¹ [1]
2. Facebook [2]
3. Amazon.com [3]
4. Priceline Group [4]
5. eBay [7]
6. LinkedIn [—]

NETWORK AND OTHER COMMUNICATIONS EQUIPMENT

1. Qualcomm [2]
2. Cisco Systems [1]
3. L.M. Ericsson [4*]
4. Motorola Solutions [3]
5. Corning [4*]
6. Juniper Networks [6]
7. Nokia [8]
8. Huawei Technologies⁴ [12]

TELECOMMUNICATIONS

1. AT&T [1]
2. Verizon Comm. [2]
3. BT Group [—]
4. Deutsche Telekom [6]
5. Telefónica [3]
6. Vodafone Group [4]
7. NTT [Nippon Telegraph & Telephone] [7]

CONSUMER PRODUCTS

APPAREL

1. Nike [1]
2. VF [2]
3. Ralph Lauren [3]
4. PVH [4]
5. Adidas [6]

BEVERAGES

1. Anheuser-Busch InBev [2]
2. Coca-Cola [1]
3. Diageo [4]
4. Heineken Holding [6]
5. Suntory [7]
6. SABMiller [9]
7. Coca-Cola Enterprises [3]
8. Dr Pepper Snapple Group [8]

CONSUMER FOOD PRODUCTS

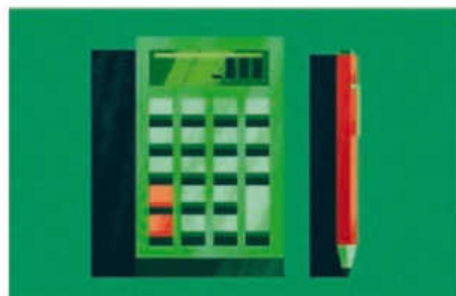
1. Nestlé [1]
2. Unilever [2]
3. PepsiCo [3]
4. Danone [4]
5. Mondelez International [6]
6. General Mills [5]

*TIE IN RANK.

- **QUALITY OF PRODUCTS** 1. Apple 2. Walt Disney 3. Amazon.com
- **QUALITY OF MANAGEMENT** 1. Apple 2. Starbucks 3. Walt Disney

- **INNOVATION** 1. Apple 2. Amazon.com 3. Alphabet
- **LONG-TERM INVESTMENT VALUE** 1. Nike 2. Walt Disney 3. Starbucks

REPUTABLE COMPANIES, AS RANKED BY PEERS IN THEIR SECTOR



FOOD PRODUCTION

1. Archer Daniels Midland [1]
2. Ingredion [2]
3. Wilmar International [5]
4. Bunge [3]
5. Tyson Foods [4]

HOME EQUIPMENT, FURNISHINGS

1. Whirlpool [1]
2. Steelcase [5]
3. Fortune Brands Home & Security [2]
4. Stanley Black & Decker [4]
5. Newell Rubbermaid [7]
6. Jarden [11]

SOAPS AND COSMETICS

1. Colgate-Palmolive [3]
2. L'Oréal [2]
3. Estée Lauder [4]
4. Henkel [6]
5. Kimberly-Clark [5]
6. Procter & Gamble [1]

CONTRACTED SERVICES

DIVERSIFIED OUTSOURCING SERVICES

1. Aramark [6]
2. Robert Half International [1*]
3. Towers Watson² [1*]
- 4.* Sodexo [5]
- 4.* ManpowerGroup [3]
6. Cintas [4]
7. ServiceMaster Global Holdings [7]

HEALTH CARE: INSURANCE AND MANAGED CARE

1. UnitedHealth Group [1]
2. Aetna [2]
3. Cigna [4]
4. Humana [3]
5. Anthem [5]
6. Centene [6]

HEALTH CARE: MEDICAL FACILITIES

1. HCA Holdings [1]
2. Universal Health Services [2]
3. DaVita HealthCare Partners [3]
4. Kindred Healthcare [7]
5. Tenet Healthcare [6]

HEALTH CARE: PHARMACY AND OTHER SERVICES

1. Quintiles Transnational Holdings [3]
2. Cerner [1]
3. Quest Diagnostics [5]
4. Envision Healthcare Holdings [7]
5. Team Health Holdings [2]

FINANCIALS

CONSUMER CREDIT CARD AND RELATED SERVICES

1. Visa [2]
2. MasterCard [3]
3. American Express [1]
4. Capital One Financial [4]
5. Discover Financial Services [5]

FINANCIAL DATA SERVICES

1. Automatic Data Processing [1]
2. Thomson Reuters [2]
3. Fiserv [5]
4. Broadridge Financial Solutions [3]
5. Fidelity National Information Services [7]

INSURANCE: LIFE AND HEALTH

1. Prudential Financial [3]
2. New York Life Insurance [4]
3. TIAA-CREF [6]
4. MetLife [1]
- 5.* Northwestern Mutual [2]
- 5.* Aflac [5]

INSURANCE: PROPERTY AND CASUALTY

1. Berkshire Hathaway [1]
2. USAA [2]
3. Swiss Re [6]
4. Travelers Cos. [3]
- 5.* State Farm Insurance Group [4]
- 5.* Zurich Insurance Group [9]
7. Allstate [7]
8. Allianz [8]

MEGABANKS

1. Goldman Sachs Group [1]
2. J.P. Morgan Chase [3]
3. Wells Fargo [2]
4. Morgan Stanley [—]
5. Bank of America [8]
6. Citigroup [6]
7. HSBC Holdings [7]
8. Mitsubishi UFJ Financial Group [9]

SECURITIES AND ASSET MANAGEMENT

1. BlackRock [1]
2. Charles Schwab [3]
3. T. Rowe Price [2]
4. Carlyle Group [4]
5. Raymond James Financial [7]
6. Franklin Resources [5]

SUPERREGIONAL BANKS

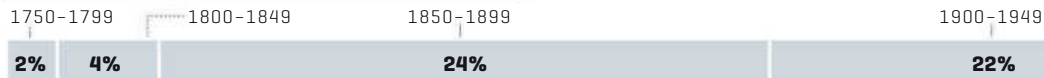
1. U.S. Bancorp [1]
2. PNC Financial Services Group [2]
3. Northern Trust [3]
4. Bank of New York Mellon [4]
5. State Street Corp. [5]
6. BB&T Corp. [6]

THE LIST 2016

THE WORLD'S MOST ADMIRED COMPANIES

- **TALENT ATTRACTION** 1. Apple 2. Facebook 3. Goldman Sachs
- **FINANCIAL SOUNDNESS** 1. Apple 2. Alphabet 3. Nike

FOUNDING PERIOD FOR THE 50 ALL-STARS



MEDIA AND ENTERTAINMENT

ENTERTAINMENT

1. **Walt Disney** [1]
2. Netflix [2*]
3. Discovery Communications [2*]
4. CBS [7*]
5. Time Warner [6]
6. Activision Blizzard [7*]
7. Liberty Media [11]

HOTELS, CASINOS, AND RESORTS

1. **Marriott Intl.** [1]
2. Hilton Worldwide Holdings [2]
3. Wynn Resorts [3]
4. Hyatt Hotels [4]
5. Wyndham Worldwide [9]
6. MGM Resorts International [8]



NATURAL RESOURCES

CHEMICALS

- 1.* **Monsanto** [1]
- 1.* **Bayer** [3*]
- 3.* Ecolab [2]
- 3.* PPG Industries [5]
5. BASF [3*]

METALS

1. **Alcoa** [1]
2. ArcelorMittal [5]
3. Nippon Steel & Sumitomo Metal [2]
4. POSCO [3]
5. JFE Holdings [8]
6. ThyssenKrupp [6]
7. Tata Steel [4]
8. Baosteel Group [7]
9. China Minmetals [9]

MINING, CRUDE-OIL PRODUCTION

1. **Occidental Petroleum** [1]
2. Devon Energy [—]
3. ConocoPhillips [2]
4. BHP Billiton [3]
5. Freeport-McMoRan [7]
6. Glencore [—]
7. Rio Tinto [6]
- 8.* Chesapeake Energy [10]
- 8.* Pemex [16]

PACKAGING, CONTAINERS

1. **Sealed Air** [1]
2. Sonoco Products [7]
- 3.* WestRock [4]
- 3.* International Paper [2]
5. Ball [6]

PHARMACEUTICALS

1. **Johnson & Johnson** [1]
2. Novartis [2]
3. Roche Group [3]
4. Bristol-Myers Squibb [4]
5. Merck [5]
6. Gilead Sciences [—]
7. Amgen [6]
8. Pfizer [9]



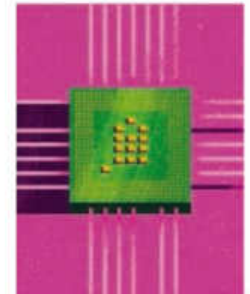
POWER

ELECTRIC AND GAS UTILITIES

1. **NextEra Energy** [2]
2. Dominion Resources [1]
3. Southern Co. [3]
4. Xcel Energy [8]
5. American Electric Power [5]
6. Exelon [6]
7. PPL [10]
8. DTE Energy [—]

PETROLEUM REFINING

1. **Exxon Mobil** [1]
2. Chevron [2]
3. Royal Dutch Shell [3]
4. Valero Energy [4]
5. Total [7]
6. Phillips 66 [6]
7. BP [8]



PRECISION

ELECTRONICS

1. **Siemens** [4]
2. General Electric [1]
3. Samsung Electronics [2]
4. Honeywell International [3]
5. Panasonic [15*]
6. Sony [13]
7. Royal Philips [6]
8. Hitachi [10]

MEDICAL PRODUCTS AND EQUIPMENT

1. **Abbott Laboratories** [1]
2. Medtronic [9]
3. 3M [2]
4. Thermo Fisher Scientific [8]
5. Stryker [6]
6. Boston Scientific [12]

SEMICONDUCTORS

1. **Intel** [1]
2. Taiwan Semiconductor [4]
3. Texas Instruments [2]
4. Nvidia [—]
5. Applied Materials [3]
6. Micron Technology [6]
7. Lam Research [—]
- 8.* Jabil Circuit [11*]
- 8.* Flextronics International [10]

- **CORPORATE ASSET USE** 1. Walt Disney 2. Starbucks 3. Apple
- **SOCIAL RESPONSIBILITY** 1. Starbucks 2. Unilever 3. Walt Disney

- **GLOBAL BUSINESS** 1. Apple 2. Walt Disney 3. Nestlé

1950-1999

46%

2000-2015

2%



SHELTER

ENGINEERING, CONSTRUCTION

1. Fluor [1]
2. Jacobs Engineering Group [2]
3. EMCOR Group [4]
4. Peter Kiewit Sons' [3]
5. AECOM [5]

HOMEBUILDERS

1. Toll Brothers [1]
2. Lennar [2]
3. D.R. Horton [5]
4. CalAtlantic Group⁷ [3]
5. PulteGroup [6]

REAL ESTATE

1. Simon Property Group [1]
2. Host Hotels & Resorts [5]
3. CBRE Group [3]
4. Equity Residential [4]
5. Vornado Realty Trust [7]



STORES AND DISTRIBUTORS

FOOD AND DRUG STORES

1. Whole Foods Market [1]
2. Publix Super Markets [2]
3. CVS Health [3]
4. Kroger [4]
5. Walgreens Boots Alliance [5]
6. Delhaize Group [7]

FOOD SERVICES

1. Starbucks [1]
2. McDonald's [4]
3. Yum Brands [2]
4. Chipotle Mexican Grill [3]
5. Panera Bread [5]

GENERAL MERCHANDISERS

1. Nordstrom [1]
2. Target [2]
3. Macy's [4]
4. Walmart Stores [3]
5. Dollar General [5]

SPECIALTY RETAILERS

1. TJX [3]
2. Costco Wholesale [1]
3. L Brands [4]
4. Home Depot [2]
5. Lowe's [6]
6. Ross Stores [10]
7. Best Buy [13]
8. Bed Bath & Beyond [9]

WHOLESALE: DIVERSIFIED

1. W.W. Grainger [1]
2. Graybar Electric [2]
3. WESCO International [7]
4. Rexel [3]
5. Wolseley [6]
6. Anixter International [8]

WHOLESALE: ELECTRONICS AND OFFICE EQUIPMENT

1. Arrow Electronics [1]
2. Avnet [2]
3. Ingram Micro [3]
4. Tech Data [4]

WHOLESALE: HEALTH CARE

1. Henry Schein [1]
2. McKesson [2]
3. Cardinal Health [4]
4. AmerisourceBergen [3]

NOTES

A DASH IN PRIOR YEAR'S RANK MEANS THE COMPANY WAS NOT IN THE SURVEY LAST YEAR. *TIE IN RANK. ¹REORGANIZED AS A HOLDING COMPANY WITH GOOGLE NOW AS A SUBSIDIARY. ²CHANGED NAME FROM HEWLETT-PACKARD. ³RANK IN COMPUTERS LAST YEAR. ⁴SUBSIDIARY OF HUAWEI INVESTMENT & HOLDING. ⁵ACQUIRED BY WILLIS TOWERS WATSON (FORMERLY WILLIS GROUP HOLDINGS). ⁶ACQUIRED MEADOWS VACO AND CHANGED NAME FROM ROCKTENN. ⁷ACQUIRED RYLAND GROUP AND CHANGED NAME FROM STANDARD PACIFIC.

INDUSTRY STANDOUTS



TRANSPORT

AEROSPACE AND DEFENSE

1. Boeing [1]
2. Lockheed Martin [3]
3. United Technologies [2]
4. Raytheon [4]
5. Northrop Grumman [5]
6. General Dynamics [6]
7. Airbus Group [7]
8. Rolls-Royce Holdings [8]

AIRLINES

1. Delta Air Lines [1]
2. Singapore Airlines [2*]
3. Air France-KLM Group [5]
4. United Continental Holdings [8]
5. Southwest Airlines [7]
6. Cathay Pacific Airways [2*]
7. Lufthansa Group [4]

CONSTRUCTION AND FARM MACHINERY

1. Caterpillar [2]
2. Deere [1]
3. Cummins [4]
4. Komatsu [6]
5. Volvo [3]

DELIVERY

1. FedEx [1]
2. Deutsche Post DHL Group [2]
3. UPS [3]
4. Japan Post Holdings [4]
5. La Poste [7]

INDUSTRIAL MACHINERY

1. Illinois Tool Works [2]
2. Parker-Hannifin [3]
3. ABB [4]
4. Ingersoll-Rand [1]
5. Dover [5]
6. Mitsubishi Heavy Industries [7]

MOTOR VEHICLE PARTS

1. Robert Bosch [1]
2. Toyota Industries [2]
3. Goodyear Tire & Rubber [3]
4. Johnson Controls [4]
5. Michelin [6]
6. Denso [8]
7. ZF Friedrichshafen [5]
8. Continental [7]

MOTOR VEHICLES

1. Toyota Motor [1]
2. BMW [2]
3. Daimler [4]
4. Hyundai Motor [8]
5. Honda Motor [5]
6. General Motors [7]
7. Volkswagen [3]
8. Nissan Motor [9]

TRUCKING, TRANSPORTATION, LOGISTICS

1. Union Pacific [1]
2. CSX [2]
3. Ryder System [5]
4. C.H. Robinson Worldwide [3]
5. J.B. Hunt Transport Services [6]

FOR MORE ON THE WORLD'S MOST ADMIRABLE COMPANIES, VISIT FORTUNE.COM/WMAC.

HOW WE DETERMINE THE LIST

THE MOST ADMIRABLE LIST

is the definitive report card on corporate reputations. Our survey partners at Korn Ferry Hay Group started with approximately 1,500 companies: the *Fortune* 1,000—the 1,000 largest U.S. companies ranked by revenue—and non-U.S. companies in *Fortune*'s Global 500 database with revenues of \$10 billion or more. Korn Ferry Hay Group then selected the 15 largest for each international industry and the 10 largest for each U.S. industry, surveying a total of 652 companies from 30 countries. To create the 54 industry lists, Korn Ferry Hay Group asked executives, directors, and analysts to rate companies in their own industry on nine criteria, from investment value to social responsibility. A company's score must rank in the top half of its industry survey to be listed.

Because of the distribution of responses, only the aggregate industry scores and ranks are published in Construction and Farm Machinery; Mining, Crude-Oil Production; and Petroleum Refining. Because of an insufficient response rate, the results for companies in the Energy: U.S. and Pipelines industries are not reported.

To arrive at the top 50 Most Admired Companies overall (our "All-Stars"), Korn Ferry Hay Group asked 4,000 executives, directors, and securities analysts who had responded to the industry surveys to select the 10 companies they admired most. They chose from a list made up of the companies that ranked in the top 25% in last year's surveys, plus those that finished in the top 20% of their industry. Anyone could vote for any company in any industry. The difference in the voting rolls is why some results can seem anomalous. For example, St. Jude Medical ranks No. 40 on the overall Most Admired list, returning after a two-year hiatus. But within the medical products and equipment subgroup, St. Jude Medical, based on its peers' responses, missed the "Industry Standouts" cut by ranking in the bottom half of the group.






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Whether our team members work out of a truck, a plane or an office, they all deliver.

FedEx is proud to be named on the FORTUNE® World's Most Admired Companies® list for 2016. Thank you to our 340,000 team members and to the business community for this honor.

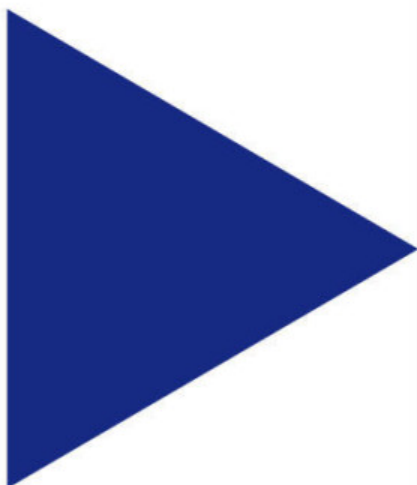


EXCLUSIVE Q&A: APPLE CEO

TIM COOK

IN AN INTERVIEW ON FEB. 12 at Apple's headquarters in Cupertino, Calif., CEO Tim Cook spoke expansively about the state of Apple, *Fortune's* most admired company for nine consecutive years. He talked about how Apple behaves in a down cycle, how the company's once-sacrosanct only-in-Cupertino mind-set is evolving, and the importance of services to Apple's product mix. Without acknowledging its existence, Cook also shed possibly contradictory light on Apple's widely rumored efforts to build an iCar: He suggested that Apple ultimately may decide not to make a car at all, yet he implied that if it did, it could utilize contract manufacturers to do so, just as it does with computers and phones. For more, read on—and for the full version, visit Fortune.com.

By ADAM LASHINSKY



Critics slammed Apple for its flat fiscal-first-quarter performance, despite selling 74 million iPhones and making \$18 billion in profit. What is your reaction?

I'm good at blocking out the noise. I come back to, Are we doing the right things? Are we remembering our North Star? Are we focused on making the best products that really help people enrich their lives in some way? And we're doing all those things. People really love our products. Customers are happy. And that's what drives us. Over time I'm sure that everything else will catch up.

Do you communicate that Apple has been through this before, or do you avoid the topic altogether?

It helps internally to remind people that Apple has been through cycles: "This too shall pass." And I think, in sort of a bizarre way, cycles can be really great. They have been for Apple because we tend to steadfastly continue to invest in innovation. And what other companies tend to do is retreat. Some of our

"WHEN WE START SPENDING LARGE AMOUNTS OF MONEY, WE'RE COMMITTED AT THAT POINT."

greatest innovations and products were born in a period of challenge. Also, assets get cheaper, so you can double down on innovation through the downturn.

You mention cheaper assets, but Apple has not historically been a big acquirer.

Well, assets come in different forms. You can build more stores for the same amount of money. You can go into geographies like India in a big way and things are cheaper. And we've been acquiring companies every three to four weeks, on average, for a while. So yes, it's also true that companies get cheaper in both the private markets and the public markets. And your own stock gets cheaper too. So it's a glass half full for me, not empty.

Apple's mentality has been that everything important from the perspective of intellectual property happens in Cupertino. Is that changing?

The vast majority of the IP is created here and continues to be created here. We have a presence in Israel, and so we also have IP being created there. And generally speaking, what's happened is that we've acquired some companies that are located somewhere else. And as we've done that, once we've gotten familiar with the location, we've hired more people in those areas.

I'm sure there was a time when Macs were 75% of revenue, as iPhones are today. Do you think about an ideal approach to product revenue mix?

Well, Macs at one time were 100%. And then iPod came along, and that mix changed. So now the way I look at it is that our focus is on making the best products. And that produces a mix of whatever it is. The result of doing that is that we now have a billion active devices out there. We've been increasingly adding services that our customers want, and the true size of the services business was almost \$9 billion last quarter.

To ask it a slightly different way, the conventional wisdom for a long time was that Apple offered services primarily as a means to the end of selling devices.

That was never the way we looked at it. The way we look at it goes back to the building of great products. And services—we think of services as a product as well. And so whether it's offering Apple Pay or Apple Music or a huge number of apps in the App Store, these are all things that are driven by the installed base [of devices] itself. And so financially it provides a great potential opportunity.

I love Apple Pay, but I wish it were available more places.

You can bet we're working on that. In the last couple of quarters we've seen a dramatic uptick as more merchants accept it. But over the next few months you'll see it going into places that people use daily.

I want to turn to the subject of innovation.

The most important thing for last.



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Indeed. You've talked generally about autos, but you haven't commented on Apple's widely reported car project. Wikipedia has a long list of prominent auto industry people who have joined Apple. Why not take this opportunity to say, "You know what? It's basically all there, and this is why we're doing it"?

Yeah, I'm probably not going to do that. The great thing about being here is we're curious people. We explore technologies, and we explore products. And we're always thinking about ways that Apple can make great products that people love, that help them in some way. And we don't go into very many categories, as you know. We edit very much. We talk about a lot of things and do fewer. We debate many things and do a lot fewer.

Can you afford to spend relatively large amounts of money on things you don't end up commercializing?

Well, could we? Yes. But would we? We don't have to spend large amounts to explore. So I can't talk about this certain area that you're talking about. But when we start spending large amounts of money, we're committed at that point. But we explore things with teams of people. And that's a part of being curious. Part of exploring technologies and picking the right one is becoming so familiar with it you can see ways that it can be used. And for us, we've never been about being first. We've been about being best. So we explore many different things, many different technologies. And at first we might not know what product it might wind up in. And then later we'll see that that really cool technology enables maybe things that we're doing today to take on something bigger, maybe something new. But once

we start spending gobs of money—like when we start spending on tooling and things like that—we're committed.

So you differentiate between spending gobs of money on tooling and having groups that may number in the hundreds of people? The latter would not necessarily constitute gobs of money?

No. I wouldn't call it gobs of money.

Do you foresee a day when a manufacturer would make an automobile on a contract basis for someone else?

I think it does exist today, but I don't think it's the model for the [auto] industry. It's not how it was born. That industry was born much like the industry that we're in, the electronics industry: People began doing their own manufacturing, and then over time it became clear that specializing would probably be a better way to go from the supply-chain point of view. And so most companies begin to go in that way, at different levels and maybe in different ways.


And so can you envision it for automobiles?

Yeah, I could. Sure. I don't think that there's a fundamental reason why that couldn't be done.

Okay, one more thing: Is there a date for the new headquarters to open?

We haven't set a date. But I'd like to be moving in in about a year, to start the moving process. Think of it as early '17. There's lots of excitement about it. It gets a lot of people back together again, which is, I think, really important. We're in so many buildings right now. It would be nice to get everybody back.

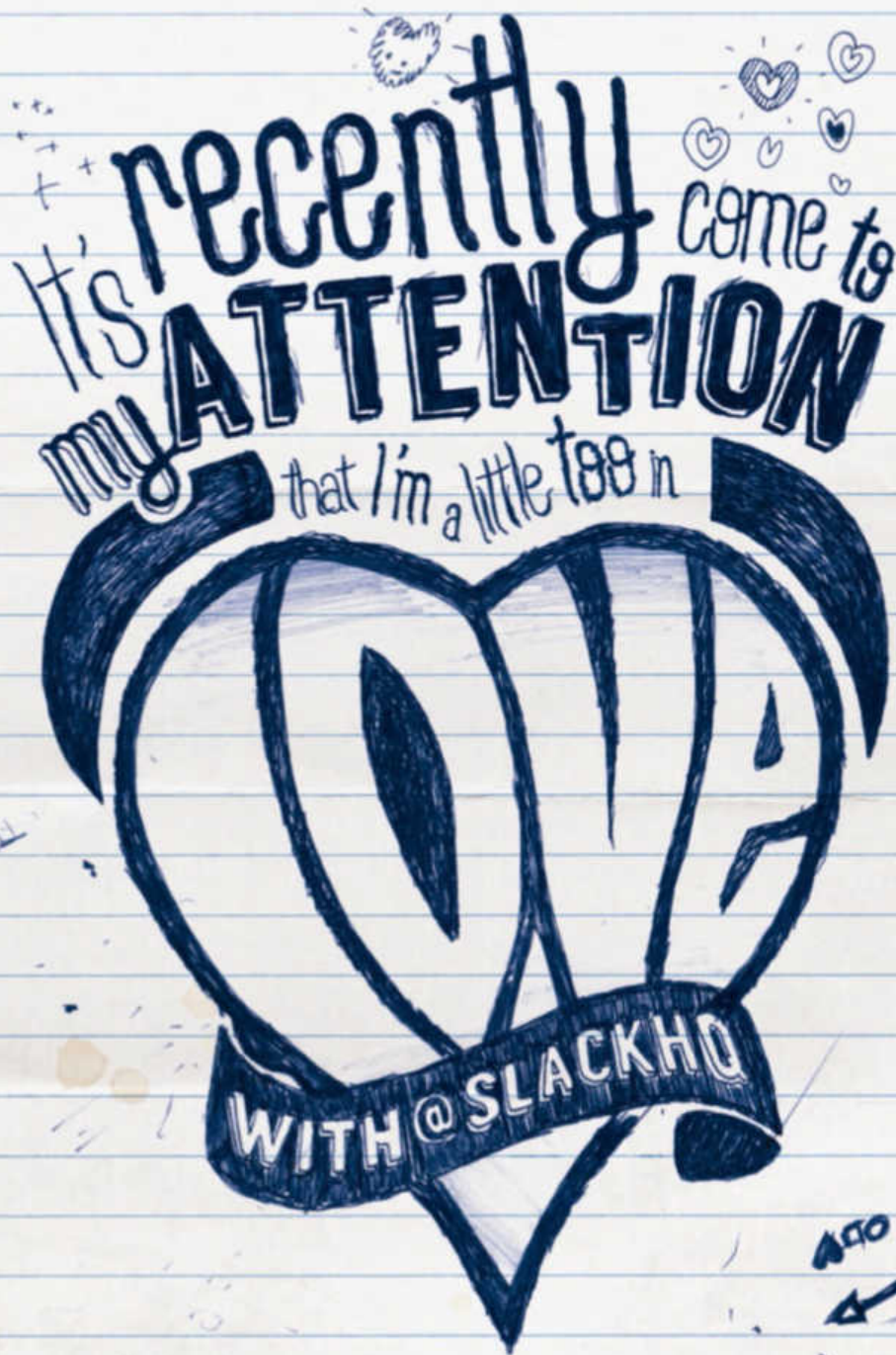
Have you made a decision on the naming of the campus? Have you settled on the way that you'll pay homage to Steve Jobs?

We're talking about it. We will definitely honor him in the right kind of way. We're working with Laurene [Powell Jobs, Steve's widow] and the family. 



APPLE'S NEW HEADQUARTERS

Under construction in Cupertino, Calif., in September 2015



We're blushing, @RonellSmith. Thank you.

We like to think Slack's changing the way teams communicate. But don't take our word for it.
slack.com/love



**BMW'S i8
PLUG-IN HYBRID**
can go from 0 to 60
in 4.2 seconds.



124

MARCH 1, 2016 | FORTUNE.COM

THE WORLD'S MOST ADMIRED COMPANIES



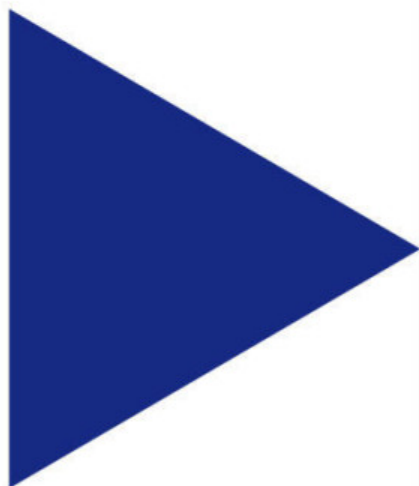
THE ULTIMATE DRIVING MACHINE PREPARES FOR A DRIVERLESS WORLD

HOW 100-YEAR-OLD
BMW IS RACING TOWARD
AUTOMATED DRIVING,
ELECTRIC CARS,
AND RIDE SHARING.



By **BRIAN DUMAINE**

PHOTOGRAPH BY ADAM LEVEY



THIS YEAR BMW TURNS 100, and it's still roaring like one of its deep-throated V-8 engines. In 2015 it outsold rivals Mercedes-Benz and Audi for the 11th straight year, keeping its crown as the largest luxury-car maker in the world. The newly launched 7 Series, which has reclining rear seats, has been wowing the auto press. What could go wrong?

Well, plenty. If Munich-based BMW wants to stay ahead of the pack, it must figure out how to maneuver through the biggest disruption in transportation since the car displaced the horse-drawn carriage. And that disruption is coming faster than most think. "The next 10 years will bring more change than the

last 30," says Christoph Grote, head of BMW's advanced technologies group.

We're not talking about more horsepower or improved handling. The very essence of the automobile is up for grabs. BMW's honchos believe that new modes of transportation are needed to reduce traffic and boost safety while lowering greenhouse gas emissions and air pollution. It's a major transformation that can be divided into three elements: autonomous driving, electrification, and car sharing. "There is an exciting alternative to the auto industry as we've known it over the last 100 years," says Larry Burns, who once ran R&D for GM and now advises Google. "A lot of people will no longer be driving themselves in heavy gas-powered vehicles that they own personally, and the industry is going to have to adapt to that."

That means BMW is now competing with some of the tech world's most powerful names. Google, Apple, Tesla, and others are spending billions to build or plan electric, self-driving cars made of lightweight composites. Tesla has become the leading seller of electric cars in the U.S. Google could have self-driving vehicles on the road within five years, a decade before the major automakers say they can do it. A Chinese startup named Faraday Future, backed by an Internet billionaire, Jia Yueting, announced that it is building a \$1 billion electric-car factory in Nevada and unveiled its 200 mph concept car in January. "We're going back to the future where we have the same kind of auto brand proliferation like we saw at the beginning of the 20th century," says Tesla's vice president of business development, Diarmuid O'Connell.

BMW's new competitors have audacious ambitions. Uber, for example, is partnering with robotics experts at Carnegie Mellon and spending heavily to design a self-driving vehicle. The car-hailing service says its core vision is to "end private car ownership." CEO Travis Kalanick reportedly told Tesla CEO Elon Musk that if Tesla could build 500,000 autonomous cars in 2020, Uber would buy every one of them. Kalanick's notion: a massive fleet of self-driving Uber vehicles ready to pick you up whenever and wherever you'd like.

That's a bit of hyperbole, perhaps, but there's plenty to worry traditional automakers, starting with the fact that, increasingly, what differentiates cars is their software. A typical premium model has 100 million lines of code, according to Boston Consulting, which estimates that a vehicle's electronics as a percentage of its total cost has doubled from 20% in 2004 to 40% last year. Software, obviously, is where Silicon Valley excels.

Still, BMW maintains it will lead this revolution. "Electro-mobility and digitalization are the clear drivers of the right strategy for the future," says BMW CEO Harald Krueger. Adds Ulrich Quay, who runs the company's venture investing unit: "We will not succeed if we just keep doing business in the same way." BMW's new ways start with launching cutting-edge electric and plug-in hybrid cars, including the popular i3 city car and the head-snapping i8 sports car. Its 7 Series can drive itself on the highway. BMW has invested in companies that enable you to rent or share a car, find parking, and get traf-



HYBRIDS, INCLUDING THE I8,
will account for most of BMW's sales
within a decade.

**“THE NEXT 10 YEARS WILL BRING
MORE CHANGE THAN THE LAST 30,” SAYS
CHRISTOPH GROTE, HEAD OF BMW’S
ADVANCED TECHNOLOGIES GROUP.**

fic information. This fall BMW joined Audi and Daimler to acquire Nokia’s digital mapping and location services business for roughly \$2.8 billion—an essential component of self-driving technology. And BMW has been working on mobility technologies similar to those of its Silicon Valley rivals.

Yet being aware of these trends is not the same as capitalizing on them. BMW faces the classic innovator’s dilemma: Successful established companies get pushed aside unless their managers know when to abandon the very products that built their prosperity. Auto manufacturers like BMW have a huge legacy to overcome, including the billions invested in factories that make gasoline-powered vehicles. Add to that unionized workforces,

hidebound dealers, and conservative boards of directors.

“It’s going to be the agile that will end up the winner,” says BMW’s Grote. “We are a great company with a lot of engineering talent. We never got stuck on what we have but always have invested in future technology to build something our customers love. And if you do that, you shouldn’t be afraid of the future.” But if self-driving cars become the norm, how will BMW market itself as the ultimate driving machine?

► **BMW MADE ITS REPUTATION BY** building fast, great-handling cars with high-performance gasoline engines. That formula is speeding toward a brick wall. According to the International Energy Agency, the number of cars and other light-duty vehicles on the road will double to 2 billion by 2050. Most of that growth will occur in the developing world. The air quality and traffic jams in Beijing and Mumbai are already horrendous. Imagine what will happen when you boost the numbers of cars on those roads dramatically. Something has to give.

Governments are already putting increasingly strict limits on emissions. In the U.S., automakers' fleets will have to average 54.5 miles per gallon by 2025. In the EU, regulations will force carmakers to reduce their average CO₂ output per car to about 95 grams per kilometer traveled by 2021, a 27% reduction from today. China is adopting standards based on the EU rules.

Perhaps the biggest challenge comes from California. By the 2025 model year, 15.4% of vehicles sold in the Golden State will have to be what regulators define (with some latitude) as having "zero" emissions—electric, hydrogen, or a plug-in hybrid. The auto research firm Edmunds estimates that in California alone companies would have to sell 270,000 such vehicles annually, up from a few thousand today, to meet the standards. Nine other states, including New York, New Jersey, and Connecticut, have said they will follow California's lead.

It's hard to see how tinkering with powertrains will get carmakers where they need to be on emissions. That's why BMW is pursuing a two-prong strategy: plug-in hybrids and hydrogen




BMW CEO Harald Krueger

cars. Already it offers five plug-in hybrids: the 330e and 740e xDrive, the X5 xDrive 40e SUV, the i8, and the i3. In 2015, U.S. sales of the i3 jumped 81% from the previous year even as gas prices fell.

BMW insists it can create the same driving experience with a hybrid as it can with its powerful gasoline engines. After driving the i8 on the streets of Austin, I concluded BMW might have a point. With its gull-wing doors, this \$140,700 two-seater sports car employs a small, turbocharged three-cylinder engine and two electric motors for a combined 357 horsepower. The i8 hits 60 mph in 4.2 seconds, faster than the company's high-performance M3. It handles as well as if not better than any BMW I have driven. On top of that, the car emits only 49 grams of CO₂ per kilometer, well within the 2021 European standards.

In the next five to 10 years, BMW's line will probably consist mostly of plug-in hybrids. Keeping a combustion engine onboard avoids the dreaded range anxiety of electric cars but it also adds weight, complexity, and cost compared with a pure electric. BMW makes an all-electric city car—the i3—but believes that drivers don't want the hassle of having to charge up every 80 miles. (Indeed, an i3 model with a small gas engine that extends the car's range to 150 miles has handily outsold the purely electric version.)

One way to eliminate range anxiety is to build a national network of superfast chargers that can refill an electric in 20 minutes—precisely what Tesla is doing. BMW, however, thinks that's too expensive. It's more enthusiastic about hydrogen cars for long-distance travel. A hydrogen car is



Morgan Stanley

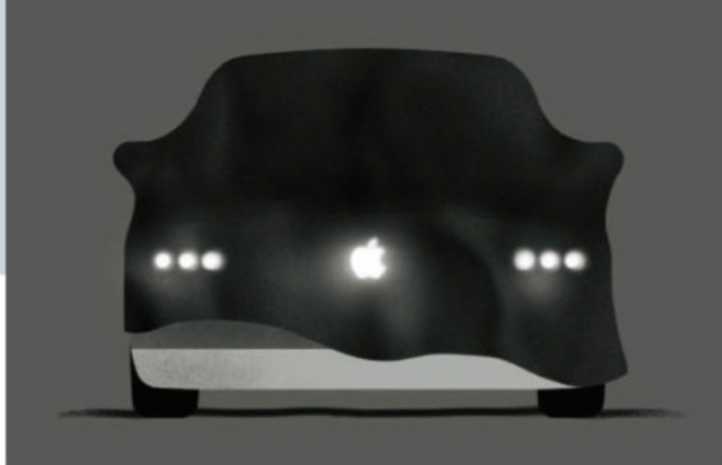
Capital Creates 23.2 Trillion Steps

That's how many steps Fitbit's millions of users have taken since the launch of the company's first tracker. Fitbit can help its users stay on top of their fitness goals. And the company knows that tracking physical activity can motivate its users to do more of it. When the company asked Morgan Stanley to help it go public, we were pleased to lead Fitbit's IPO, raising more than \$841 million. The company is now expanding its reach abroad and continuing to develop innovative products that help make fitness more fun. Ready to take the next step? So are we. Capital creates change.

morganstanley.com/fitbit

The statements "23.2 Trillion Steps" and "That's how many steps Fitbit's millions of users have taken since the launch of the company's first tracker" are as of September 30, 2015, and are based on Fitbit's SEC filing on November 13, 2015. Fitbit's IPO raised more than \$841 million, including primary and secondary proceeds, after exercise of the underwriters' option to purchase additional shares, as per Fitbit's press release dated June 23, 2015.

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very similar to an electric but instead of being powered by a battery, it uses a hydrogen fuel cell to run the car's electric motors. Just fill up with hydrogen and you can drive 300 miles or so. BMW, in collaboration with Toyota, has a hydrogen prototype car about which BMW's Grote says, "You'd be surprised how convincing it is."

As with electrics, hydrogen cars don't yet have the fueling infrastructure—a huge shortcoming. Germany is already building such a network, and the state of California has earmarked \$200 million to support anyone who wants to build hydrogen stations, but so far the U.S. has only a handful of them. It's also not clear whether using natural gas—the most common process to make hydrogen—significantly reduces carbon emissions. Hydrogen's shortcomings have led Tesla's Musk to refer to the technology as "hydrogen fool."

Another argument against hydrogen is that batteries are getting cheaper and better. GM recently announced it will start selling the Chevrolet Bolt this year, an all-electric that gets 200 miles per charge and sells for \$30,000 after federal subsidies. In 2017, Tesla plans to have an all-electric, the Model 3, for \$27,500 (after subsidies), with a range of at least 200 miles.

Hybrid, electric, and hydrogen cars are more expensive to buy than conventional cars, but the lifetime ownership costs can be cheaper. That's because electricity costs less than gasoline (hydrogen has similar potential) and the mechanicals and maintenance are simpler (no transmission, complex gas engine, or cooling system). That said, sales of plug-ins, such as the Nissan Leaf and Chevy Volt, have suffered from today's low gas prices.

THE APPLE MYSTERY

WILL THE IPHONE MAKER BUILD A CAR?

IF YOU GOOGLE "Apple" and "car," you get 354 million hits—but Apple CEO Tim Cook would say little more than "We talk about a lot of things and do fewer" when *Fortune* asked about building an electric vehicle. [See our interview with Cook on page 119]. In short, there's frenzied interest—and scant detail—on what Apple is actually up to. One prominent venture capitalist says he recently met with three close friends who are working on Apple's car project, but they wouldn't even acknowledge involvement, much less share details.

So what do we know? Apple recently registered some relevant domain names—including [apple.car](#) and [apple.auto](#)—and there's evidence it may have been checking out a former military base in the Bay Area for car

testing. The company has been hiring hundreds of engineers and executives from established auto companies as well as from Tesla and car-battery startups like A123, which sued Apple for raiding its talent. Stefan Heck, a Stanford professor who started Nauto, a self-driving systems company, says he has interviewed a lot of the same engineers who ended up going to Apple's car program. "Most were self-driving tech experts," he says.

Apple watchers remain divided over whether the company is aiming to build an electric car itself or design it and outsource the manufacturing, as it does with other products. In all likelihood, Apple itself doesn't know what it will end up designing and is hiring experts in every related field who can throw things against the

wall to see what sticks.

Why do that? Growth is hard to find when you're Apple's size, and transportation is one of the few industries with the necessary scale. It's also where people increasingly use the products and services Apple offers.

Of course, it's not easy to build a car, and history is littered with failures, among them recently deceased electric-vehicle makers Coda, Fisker, Think, and Aptera. Apple's car program has already lost some high-profile managers, including Steve Zadesky, who headed the project. Says one industry insider: "There's a lot of corporate hubris out there these days." The difference is Apple has the money to pull it off: some \$216 billion in cash. And whatever Apple does, it does well. So don't count it out.

▶ **ANOTHER BIG PHILOSOPHICAL GAP** between Silicon Valley and BMW is the timetable for self-driving cars. Tesla and Google see no reason they won't be in use by 2020. The benefits are obvious: reducing global traffic deaths (now 1.2 million each year) and congestion. If you had self-driving cars whirring along the interstates at high speeds, each five feet apart, a four-lane road could handle the same volume as a 32-lane highway.

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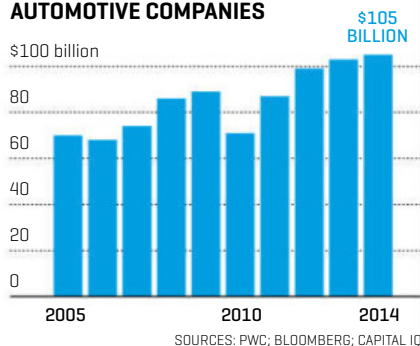
Self-driving vehicles could provide transport for the elderly, the disabled, and the young. You could enjoy a few (or more) glasses of wine at your favorite restaurant and be safely chauffeured home. Musk, speaking last summer at a conference, argued, “We may outlaw driving cars because it’s too dangerous. You can’t have a person driving a two-ton death machine.”

Along with most other major carmakers, BMW has gotten on the self-driving bandwagon. It has a 5 Series prototype that can drive itself. Toyota, Nissan, and Daimler have all announced big investments or self-driving concept cars.

But most major automakers believe completely autonomous cars won’t be common until 2030 or 2035. First, the technology is expensive (though costs are sure to drop when produced at scale). That’s why the first place we’re likely to see self-driving vehicles is in shared fleets like those Uber is envisioning. A car driven 70,000 miles a year offers a better return on expensive laser and sensor systems than one that’s privately owned.

TECHNOLOGY ROAD RACE: AUTO COMPANIES REV UP THEIR R&D

TOTAL R&D SPENDING BY AUTOMOTIVE COMPANIES



“WE MAY OUTLAW DRIVING CARS BECAUSE IT’S TOO DANGEROUS,” ELON MUSK ARGUED. “YOU CAN’T HAVE A PERSON DRIVING A TWO-TON DEATH MACHINE.”

Another worry is that the technology isn’t ready. Can the car react properly if something unexpected suddenly appears in the road? Do you program it to hit a kid who runs in front of your car or direct it into a tree where you end up the casualty? “The human brain is an amazing device,” says Tesla’s O’Connell. “But if we have a learning software out there where every mile a car drives it learns something new, the software becomes safer and more useful.”

To understand why Silicon Valley is more optimistic about autonomous vehicles, take a drive with me on Highway 101 in Palo Alto in a Tesla S sedan equipped with its new Auto Pilot software. The owner of the car, Stefan Heck, is a Stanford professor and founder of Nauto, a startup that’s designing a system to retrofit and network today’s cars to make driving safer and more efficient. We are traveling about 75 mph, and I don’t have my hands on the steering wheel. I’m feeling very nervous, and I’m thinking Heck should look a lot more worried than he does. Still, I decide to try the automated lane-change function: I flick the directional signal to the left; the car accelerates until it finds an opening and then darts into the left lane, with my hands still off the wheel.

As we continue down the 101, I ask Heck why the directional signal keeps blinking after we change lanes. “Good point,” he replies. He touches an icon on the dashboard screen and says, “Make the directional signal automatically turn off after changing lanes.” This bug alert is sent to Tesla’s engineers in Fremont, Calif., who presumably will work on a fix. The point is that Tesla is willing to take risks with self-driving technology and fix problems on the fly.

BMW knows how to make a car drive itself. But it’s more cautious—it wants its R&D crew, not its customers, to do the testing. This might be prudent, but it puts the company at a disadvantage. Silicon Valley is very good at quick iterations: Launch, get user feedback, fix, then relaunch. This approach helps explain why the Googles and Teslas of the world believe they can begin selling truly autonomous vehicles a decade ahead of the major automakers.

▶ **IN MANHATTAN’S** West Village, a neighborhood with ever more startups and hipster restaurants, BMW opened an office for its venture capital arm, iVentures. (The “i” stands for innovation.) The loft space is inhabited by a number of startups run by twentysomethings—many backed by BMW. Think of it as an incubator for the mobility of the future. Ulrich Quay, whose previous job at BMW was as an in-house lawyer, runs this \$100 million fund. His mission is to invest in startups that will keep the company up to speed on the dramatic changes occurring in transportation.

Quay says he and his team have looked at about 1,500 different companies and invested in about a dozen. BMW owns part of Just Park, an app that allows people to rent out their driveways when they’re not being used; ChargePoint, the largest maker of electric-car charging stations in the U.S.; and the Israeli company Moovit, which has an app to help people get from A to B using public transportation.



Sarah Garcia, Architect

I help make the world a beautiful place, but the hours are crazy. So it's great that AT&T connects me to my front door, so when I'm out scouting, I can still unlock it for my contractors who need to pick up blueprints.

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One of BMW's investment themes is car sharing. Consider that we use our private vehicles on average only 4% of the time; they sit idle 23 hours a day. The value of the billion cars on the road globally is roughly \$20 trillion—does it make sense to use such valuable assets only 4% of the time? Says Brook Porter of venture capital firm Kleiner Perkins, which is an investor in Uber and car-sharing startup Touro: “The companies that just make the widgets are going to become commoditized. So you're going to need to move more toward a service model where you see an increased utilization of cars.”

The appeal of these services is obvious. Americans spend about \$1,500 a month on their cars, and in an urban environment a vehicle can be expensive and a hassle to park. Why not just borrow one when you need it? It's easier and cheaper. Susan Shaheen, a professor at the Transportation Sustainability Research Center at the University of California at Berkeley, estimates that today there are 4.8 million car-sharing members in 33 countries, with about a third of them in North America. According to Navigant Consulting, the global revenue of car-sharing services will grow from \$1 billion in 2013 to \$6.2 billion by 2020, with over 12 million members worldwide.

BMW is betting on DriveNow. It owns 50% of the sharing service, which operates in nine cities, most of them in Europe. The DriveNow app offers access to a range of BMW vehicles, which it rents by the minute. Unlike a Zipcar, which needs to be returned where you started, a DriveNow vehicle can be dropped off anywhere you'd like within certain zones. (Zipcar is now testing its own one-way service.)



A GESTURE CAN CONTROL
a phone or the sound system on BMW's 7 Series cars.

PARADISE, BY THE DASHBOARD?

HOW “CONNECTIVITY” IS BECOMING CRUCIAL.

IT'S HARD TO BELIEVE

that smartphones have been around for less than a decade, given how integral they have become to shopping, navigation, games, and listening to music. The auto industry has tried to join this mobility revolution, but the “connected car” hasn't lived up to its hype. Ford pulled the plug on its My Ford Touch in-dash communications system a few years ago because of consumer complaints. Frustration with the navigation system in my Audi A4, which I otherwise love, has led me to use Google's Waze on my iPhone instead. And who hasn't been stumped by a voice-recognition system? Tell your car you would like to drive to Des Moines, and it might give you directions to Delray Beach, Fla. J.D. Power says Bluetooth connectivity and voice-recognition issues are

now the most frequently reported problems after three years of ownership.

Connectivity—how car and driver interact—is already becoming a crucial competitive differentiator, and luxury-car companies are making deals with software companies. BMW has its own in-dash system but in the near future will offer Apple's Carplay and Android's Auto systems, which pair with a driver's smartphone and transform the car's touch screen so it looks like a streamlined version of your phone's screen. You can choose Spotify or Pandora for music, send a text by voice command, and access maps. You can already do much of this through your phone with a Bluetooth connection, but having your familiar phone apps on a big dashboard screen is

easier and safer to use.

BMW's top-of-the-line 7 Series [\$81,300] now offers “hand-gesture control.” Rotate your finger to the right, and an infrared camera picks up the motion and turns up the volume on the sound system. If you want to accept a phone call, point at the screen; to decline, wave it away. The idea is to control such functions without taking your eyes off the road, making for safer, more relaxed driving.

Uwe Higgen, the head of BMW's Silicon Valley R&D center, says, “The next big step is to put information where the driver needs it.” The company, for example, has an Apple Watch app for its i Series that lets you set the car's heater remotely or find your car in a big parking lot. A single tap on the screen of your Apple Watch will also lock the car doors.

One challenge is finding parking spaces where renters can drop off the cars. In October, DriveNow was forced to pull out of San Francisco—its only U.S. market—when the city refused to grant it permits to park on the street. Undaunted, BMW says it will open new locations in the U.S. Another obstacle is that Americans, with the exception of city dwellers, are unlikely to give up the convenience of having their own car.

So far the car-sharing market is crowded, and profits are hard to come

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by. Besides BMW, other carmakers such as Daimler, Audi, Ford, and GM have car-sharing programs, as do most large rent-a-car companies. (Avis acquired Zipcar in 2013.) In January, GM announced a \$500 million investment in Uber rival Lyft. Add to these a slew of independents, such as City Car Share and Getaround. One of the reasons it's hard to make money is that the giant car-rental chains and major automakers have a lot of overhead, such as offices and drop-off centers, that cut into margins. (Hertz last year shut down its U.S. sharing business.)

BMW is hedging its bet on DriveNow by testing peer-to-peer sharing. Any owner of a Mini (a division of

BMW) can rent out her car while she's not using it. The business model is appealing because the owner who rents her car has no extra overhead (think Airbnb for automobiles). BMW provides the app to connect the Mini owner with the renter and the insurance and collects a fee on the rental. It's too early to tell whether this concept has wheels.

BMW doesn't view car sharing as a big threat to its sales. In fact, sharing could expose young drivers to brands they otherwise couldn't afford. BMW says its DriveNow members in Germany are on average about 30 years old, while buyers of its Mini brand are about 40 and BMW customers about 50. The hope is that when those thirtysomethings become old enough to afford a BMW, they will already know and like the brand.

Because it takes four or five years to design and build a new car, BMW's next generation of smart vehicles won't start hitting the showrooms until the beginning of the next decade. Until then the company will do just fine selling its traditional luxury vehicles. The real question is, Will the decisions it makes today be radical enough to compete in the long run with aggressive Silicon Valley players like Google, Apple, and Tesla? BMW's surviving another 100 years depends on it. **F**

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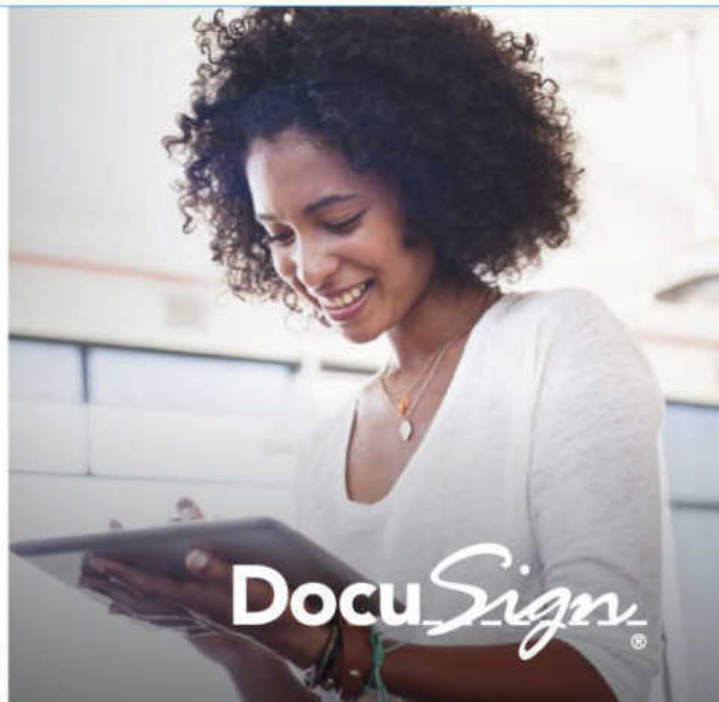
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enues exceeding \$9 billion and 15,000 employees worldwide, defines sustainability as a combination of environmental stewardship, social responsibility, and economic growth. For the fourth consecutive year, the U.S. Environmental Protection Agency (EPA) has recognized the company with its ENERGY STAR® Partner of the Year Award for superior energy management. In November, the company also won the prestigious American Institute of Chemical Engineers (AIChE) award for excellence in advancing process safety.

Significantly, Eastman seeks out others at the forefront of sustainability to support. For example, it contributed funding to the Woods Hole Oceanographic Institution for ocean research to better understand long-term weather patterns. In addition, the Eastman Innovation Lab, a platform created to advance innovation through design thinking and material education, works closely with the industrial design and architecture communities to understand the material needs of the market and bring those insights back in-house.

"Sustainability really drives our innovation platform and our innovation strategy," says Crawford. "On a global basis we're seeing a scarcity of food, water, and energy. It really implies that the way we've done work in the past is simply not possible anymore. From our perspective, we see that as an opportunity to keep developing new products that make our planet healthier while optimizing consumer safety and meeting their high expectations for performance." ●

reduce energy output by improving rolling resistance, handling better, and lasting longer, too. And Eastman products added to car coatings boost overall durability while releasing fewer dangerous compounds into the atmosphere.

"Our innovation model is designed to target areas where sustainability macro-trends and unserved consumer needs align with our technology platforms, and transportation is clearly an area where those elements come together," says Steve Crawford, senior vice president and CTO for Eastman.

The company, which has annual rev-



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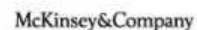
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March 1, 2016

WHILE YOU WERE OUT

Artificially Intelligent

I have seen the future, and it is "Betty." After a chat with my insurance company's virtual assistant, I'm ready to pass on AI. *By Stanley Bing*

YOU KNOW, I'm willing to swallow a lot of stuff: Jeff Bezos taking us into space. Elon Musk moving us around at the speed of sound in hermetically sealed tubes. But artificial intelligence? I'm not so sure. It's possible that when machines are taught to think, they'll be just as stupid as we are.

Let me tell you a story. The dental insurance site was down, and I needed to print out a set of ID cards. So I contacted Betty, the live-chat help person. Her thumbnail made her look pretty and friendly. But it was all a sham. Betty was really "Betty." What follows is our text "conversation." I swear on next year's bonus that every word is true, but I've changed Betty's name to protect her company, which may be an advertiser.

BETTY: Hi. I'm Betty, your virtual assistant. Let me help you. To get the most from your member website, please log in or register.

ME: Hi, Betty. Your "technical issues" are preventing me from printing out a temporary dental card. The website has been down ALL DAY, even though a message box says it will be "working again shortly." Anything you can do to help me?

BETTY: You may find answers that may be related to your question below.

- Print Dental ID Cards
- Unable to Print Another Member's ID Card

ME: It is not "working again shortly," by the way.

BETTY: I am here to help you if you have any questions.

- Log-In Help
- Registration Help

ME: What about the fact I CAN'T log in, because your site has been down all day?

BETTY: I'm here to help you log in to the website.

- If you forgot your log-in information or are not sure if you're registered, click the link below.
- If you receive a website error, try logging in to the website at a later time.



ME: I bet you're just a reply bot.

BETTY: I'm sorry. I'm having trouble understanding you. Please try rewording your question.

ME: Are you a person or a computer? Do you speak English?

BETTY: I only speak English. Please ask me a question.

- Here's More: Información en Español (Spanish Support)

ME: There is no Betty, only Zuul.

BETTY: I'm sorry I couldn't help with your question. If you need further assistance, please contact Member Services.

ME: This site is a joke.

BETTY: I'm not sure I understand what

you mean. Please tell me what you are looking for.

ME: I am looking for a decent hot dog in Los Angeles.

BETTY: I'm sorry, I don't understand your question. You may want to try to ask me about a specific topic or phrase.

ME: I never knew how virtual a virtual assistant could be!

BETTY: I am a dynamic and intelligent virtual guide who can help you with information on this website. Although I am not a real person, I can answer general questions about what you'll find here.

ME: Do you have a virtual dog?

BETTY: Our virtual family has a dog and a cat.

ME: (Stunned.) Do you feed them virtual kibble?

BETTY: I'm sorry, I don't understand your question. You may want to try to ask me about a specific topic or phrase.

ME: Goodbye, Betty. Have a virtual day.

BETTY: Goodbye. Thank you for stopping by. I hope I've been helpful. I'm always here if you have more questions about how to access your secure member website.

That was the end of our chat. Is that how all robots will be in the future? Do I want one driving my car? Running my smart home? No, I don't. I just hope I have a choice. **FB**

Follow Stanley Bing at stanleybing.com and on Twitter at [@thebingblog](https://twitter.com/thebingblog).

Fortune (ISSN 0015-8295) is published monthly, with extra issues in March, June, September, and December, by Time Inc. Principal office: 225 Liberty St., New York, N.Y. 10081-1008. U.S. subscriptions: \$22.00 for one year. Member: Alliance for Audited Media. POSTMASTER: Send all UAA to CFS (See DMM 5071.5.2). Non-Postal and Military Facilities: Send address corrections to Fortune, P.O. Box 62120, Tampa, Fla. 33662-2120. Canada Post Publications Mail Agreement No. 40110178. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Return undeliverable Canada addresses to: Postal Sales A, P.O. Box 4321, Toronto, ON, M5W 3G8. GST #888361621RT0001. Customer Service and Subscriptions: For 24/7 service, please use our website: www.fortune.com/customerservice. You can also call 1-800-621-8000 or write to Fortune at P.O. Box 62120, Tampa, Fla. 33662-2120. © 2016 Time Inc. All rights reserved. Fortune is a registered mark of Time Inc. PRINTED IN THE U.S.A. Subscribers: If the postal services alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Your bank may provide updates to the card information we have on file. You may opt-out of this service at any time. Mailing List: We make a portion of our mailing list available to reputable firms.





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¹ A minimum of \$2,000 is required to open a CD and must be deposited in a single transaction. A penalty may be imposed for early withdrawals. After maturity, if you choose to roll over your CD, you will earn the base rate of interest in effect at that time.

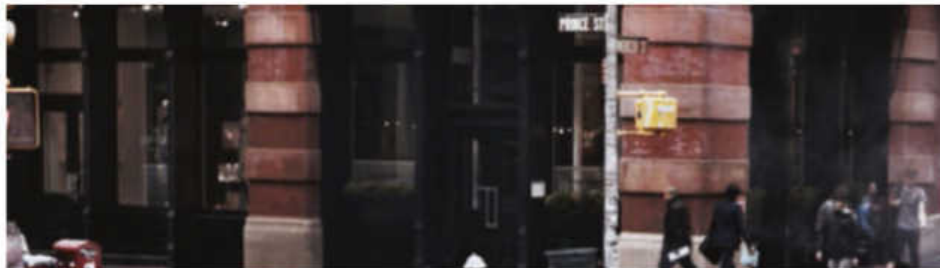
² For High Yield Savings Accounts, rates are variable and subject to change any time without notice after the account is opened. A minimum of \$30 is required to open an account and avoid a \$5 monthly service charge.

³ National Average APYs based on specific product types of top 50 U.S. banks (ranked by total deposits) provided by Informa Research Services, Inc. as of 2/1/16. CD Rates: Average APYs are based on certificate of deposit accounts of \$25,000. High Yield Savings Rates: Average APYs are based on high yield savings accounts for \$10,000. Although the information provided by Informa Research Services, Inc. has been obtained from the various institutions, accuracy cannot be guaranteed.

[†] FDIC Insurance up to \$250,000 per depositor, per insured bank, for each ownership category.

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